

CIO

The Magazine for Information Executives

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DEGREES—
HYPE OR FAD?

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Anita Borg, founder and
president of the Institute for
Women and Technology



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Making the net work for B2B™

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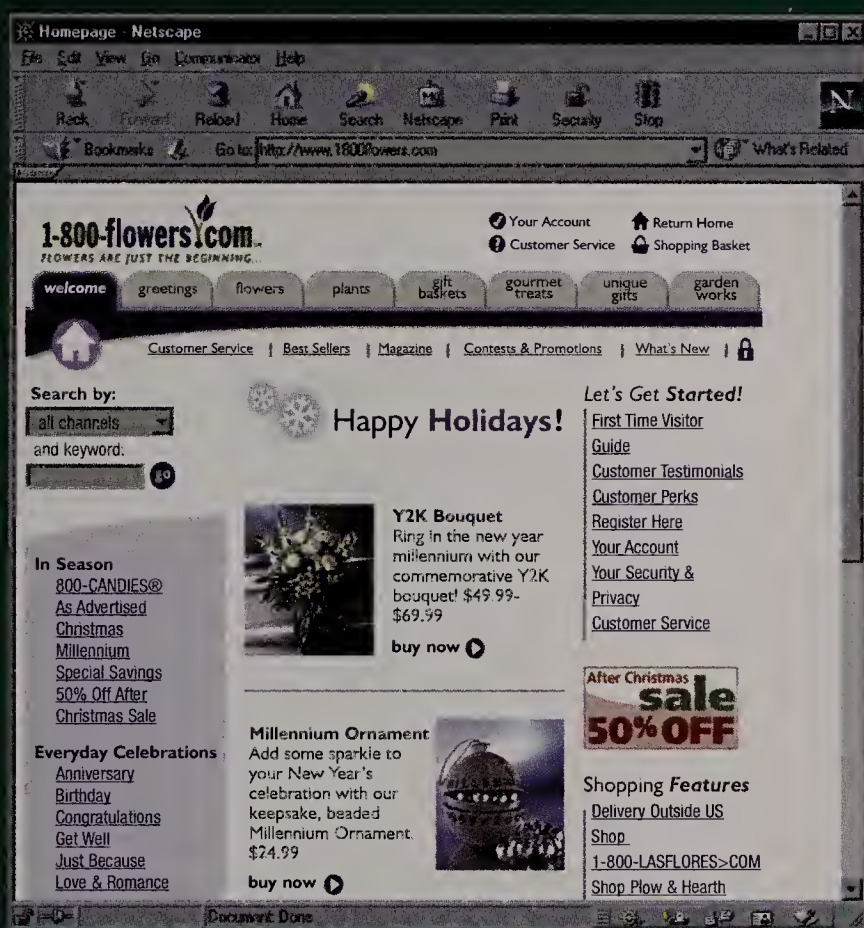
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END USER SUPPORT Nikki Stange combines the human touch she gained as a suicide hotline attendant with technical skills to calm users in crisis over lost data. *By Tom Field*

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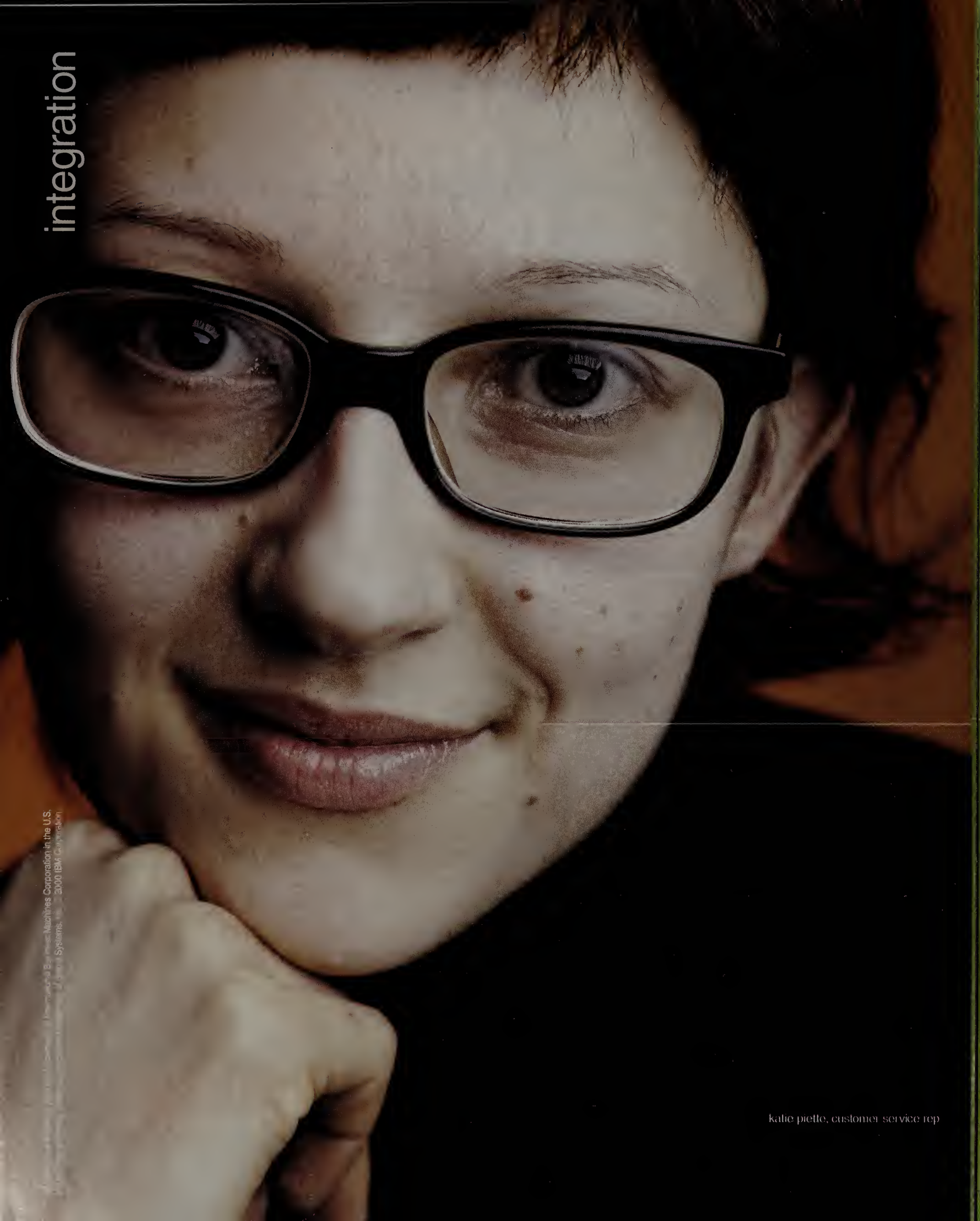
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katie piette, customer service rep

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—Richard Day, CTO of Speedera



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Heller

Should You Take Your Best People with You When You Leave?

SOUND OFF You've accepted a new position but fear you won't find comparable employees at your new company. With today's shortage of IS workers, can you afford not to grab the best people on your way out the door? Read Senior Web Editor Martha Heller's column and join the debate.

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7. performance
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From the Executive Editor

pastore@cio.com

Bricks Beat Clicks!

Earlier this spring I had a tough decision to make. I intended to put down a hardwood floor over the hideous vinyl in my kitchen, a project that would raise the floor three-quarters of an inch. My built-in dishwasher would not accommodate the height increase, so I was faced with two choices: raise all my cabinetry and plumbing, or replace the dishwasher with a shorter one. Since my dishwasher had recently sprung a leak, it was an easy decision.

Being the good cybershopper that I am, I turned to the Web to search out odd-size dishwasher models. Pay dirt. An online compact-appliance retailer, which shall remain nameless, had the perfect machine. After making certain the manufacturer wouldn't sell it to me directly (I'm a chronic disintermediator), I placed my order and resigned to wait the "six to eight weeks" for delivery. To my surprise, it arrived on time. To my disappointment, there was an arm's-length gash in the box and a major dent peeking through. Thank you, Butterfinger Trucking Co. I refused the washer, and as the deliveryman drove off, my wife Carolyn shoved another Tupperware container under the leaky old washer.

So I called the Web retailer for a replacement. To my amazement, an actual human answered the phone, with a Texas accent no less. He pledged to expedite a second machine, but it would take another month to get one. He

called his distributor to verify this and promised to call me when it was in. A month later, no call. Further discussion with the Texan revealed that he couldn't get ahold of a machine for yet another month. What did I want to do? he asked. Censoring myself, I told him I'd look for another dealer.

I found one in Cambridge, Mass., about 30 miles from my home, at a 51-year-old brick-and-mortar dealer called Sozio Appliance. Sozio claimed it could get the machine in a week and install it for an extra \$30. Sure enough, the company got it to me, dent-free. I called the Texan and told him I no longer needed his services.

In this issue of *CIO*, we write of the importance of real-time inventory data for business-to-consumer Web retailers (see "Ain't Nothing Like the Real Thing," Page 96). I'd argue that inventory data is not enough. Clearly the Texans had a line on inventory and availability from their distributors. Nevertheless, their supply chain was incapable of delivering a working machine to my door. Real-time inventory and the promises of retailers and distributors aren't worth a soap bubble if the supply chain is all wet. Sozio's chain was solid, and it won my \$699.

After three months, my kitchen floor project could begin—except now Carolyn's decided she likes the vinyl after all.

Richard Pastore

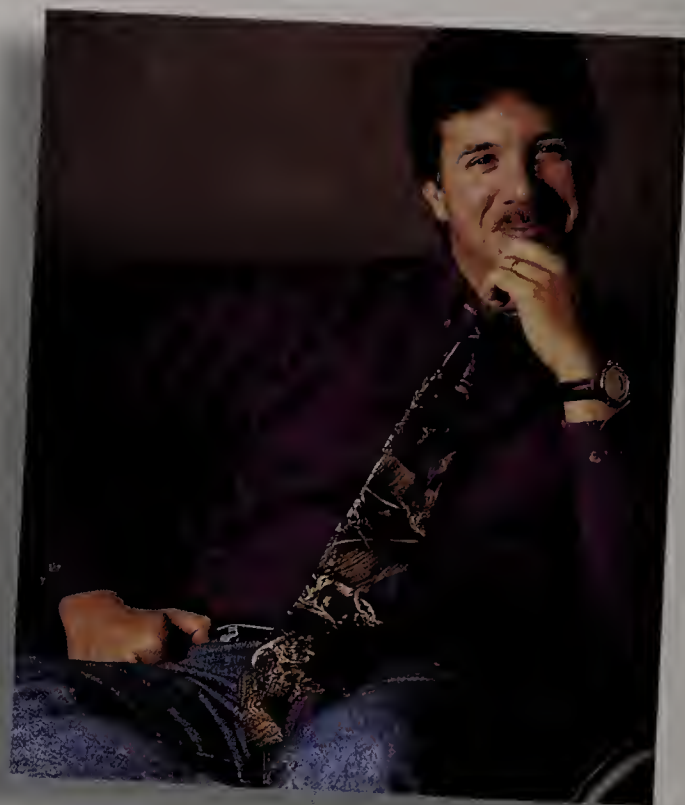


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Reader Feedback

ERP AS AN OPERATING SYSTEM

ERP end user training is, of course, a major issue, but it is far from the root cause of the vast majority of ERP "blowups" ["ERP Training Stinks," June 1, 2000]. As a 15-year veteran of ERP adoptions and with 30 years' experience in business management, I believe the answer is far more insidious and far more predictable.

The major failure is, as with any large undertaking, a failure to understand the goals from the outset, the failure of management to support the initiative with credibility and the failure to control the scope of the undertaking. More than any other initiative of the last 30 years, nothing has been as misunderstood as ERP because nothing has had quite so pervasive an effect on the business since the adoption of American inventor Fredrick Taylor's theories.

Stated simply, ERP is not software, and it is not a project; ERP is a business operating system. Viewing this system as anything less than an attack on the way you do business will doom you to fail to achieve ROI, to reach your goals and to get anything more than the comparatively minuscule savings within IT. Cycle-time reduction, streamlined interfaces, enhanced inter- and intra-enterprise communication, and the timely delivery of information when and where needed require this understanding.

Ed Markowitz • President • E-strategy • abscincinnati@fuse.net

LONG LIVE I.T.!

I find that I'm becoming a senior citizen in the IT community, and I cannot resist reacting to your special report on the death of IT ["IS at the Crossroads," June 15, 2000].

I believe that as long as the predominant business model involves shareholder ownership, creditors and an active stock market, we'll see conditions that require a separate IS department for several reasons:

- The personality preferences of people who become executives do not lend themselves to the detailed analysis and planning needed to build or maintain the computer systems that enable the business processes of the corporation.
- These business processes are formalized, documented and stored in only one place within the corporation—IS.
- The detailed coordination between

a corporation's departments of the business processes takes place only in IS.

Call me an arrogant arthritic, or a relic of a declining empire, but as a programmer trainee, I recall being told that Cobol was invented for use by accountants and that programmers would no longer be needed.

Joseph K. Merton

Manager, IT Administrative Services

US Cellular Corp.

Chicago

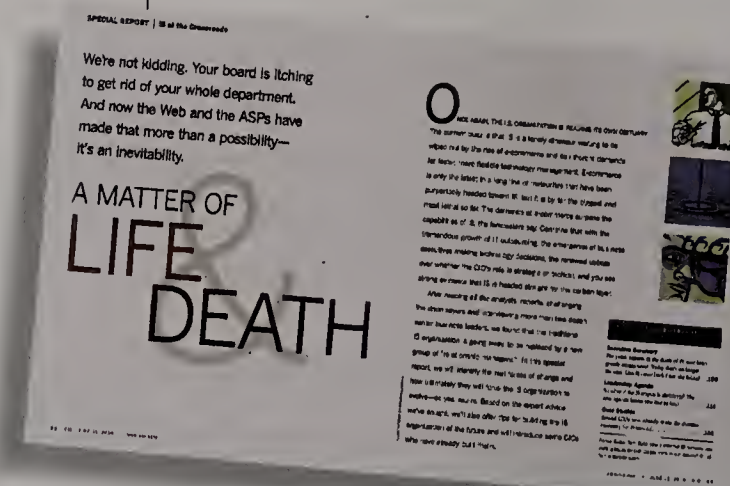
joe.merton@uscellular.com

The premise that IT departments will not be able to handle the change as e-business takes over and that companies should therefore outsource much, if not all, of IT is ludicrous.

I have been involved in or have seen

the results of outsourcing efforts in many companies and have yet to see one that has come close to delivering the quality that it promised for the cost that was contracted up front. Often, costs continue to escalate (both from the payments to the vendor and the workarounds implemented by the company) as the outsourcing vendor discovers what it has really gotten itself into.

For outsourcing to be effective, a few stumbling blocks need to be removed. First, prior to the engagement, the company needs to articulate exactly what requirements and services it expects from the agreement. In my experience, the company can only divulge this information at a high level, which leaves the door open for the outsourcing vendor.



This leads to the second issue—writing the contract with a pay-for-performance clause. Without such a clause, the vendor will continue to raise its costs to meet the expected service-level agreements (if they were ever really defined), or it will deliver subpar service. In the past, whenever I have tried to implement a pay-for-performance, incentive-based contract, the vendor

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was willing to do it, but at a cost point that was so high it would ensure that it would have enough margin to significantly increase its resources if necessary.

Lastly, I think it is important to determine how the outsourcer is going to staff the job. Often, the outsourcer takes over the internal resources the company employs. But I don't see how that is going to cause significant change. There is a finite number of workers with IT skills (whether they work directly for the company or for the outsourcer). By moving work externally, you are just transferring the headache, and the cost of the medicine ain't cheap.

I agree that the IT department will no longer be the owner of all technol-

of the problem—IT managers can't manage and lead—not the dawn of the Internet economy.

By outsourcing, you are hoping to get better management. I'm not sure why I would pay the premium price.

Kevin Quaile
eServicing Manager
Winston-Salem, N.C.
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LEADERS, BE NIMBLE

Kudos for an excellent article ["Be Nimble, Be Quick," June 15, 2000]. This was a topic waiting to be addressed in today's fast-changing IT scenario, and the important issue, as you stress in the article, is the balance of the strategic with the tactical.

souls routinely strut their stuff. Where do businesses get these people?

No wonder many big IT initiatives fail—too many buzzwords and not enough practical knowledge. Or some old data processing windbags determined to show management and the user community the errors of their ways by terrorizing them....

Mark Graham
President
GMI Consulting
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AVOID SCOPE CREEP

I agree with your comments in the June 1, 2000, issue ["The Winner's Circle"]. There are simply too many instances of B2B sites trying to fool all the customers all the time.

We at Fashionchain.com made the conscious decision to avoid this scope creep and focus on one industry (apparel/footwear) and one functional area (collaboration among supply chain partners). To be sure, we are partnering with exchanges and other Web-based businesses whose missions dovetail with ours, but the fallacy of trying to address every business problem by throwing something webby at it was apparent to us from the beginning.

While this approach might not have the sizzle of the be-all-to-everyone approach, I do think that in the end we will see many of these functional hypermarkets fizzle out.

Bob Fately
Director of Product Marketing
Fashionchain.com
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No wonder many big IT initiatives fail—too many buzzwords and not enough practical knowledge.

ogy. Businesspeople will have to become more technically savvy in the ways of the Internet, or they will fail. As this happens, IS will no longer be required to control the technical reins; however, it will require some coordination so that each line of business doesn't take dramatically different approaches to solving very similar business needs.

If companies are willing to pay more for better service then they should also be willing to spend more on IT. The thing that needs to change, however, is that rather than continuing to sink big bucks into IT and watch it go wasted, companies should sink the money into recruiting and training management. As IT has rapidly grown over the past decade, IT management has usually come up through the technical ranks and doesn't have a clue about leading people, forging partnerships or thinking strategically (but they can configure a router in five minutes). This is the root

With regard to your point that the success of IT strategy depends largely on its alignment with the business vision, I would like to add that it also depends on the visionary leader you choose to lead your IT. He has to be constantly gazing in the crystal ball and predicting and preparing for the future while having the nimbleness to move quickly and efficiently. The ability to envision is what separates a leader from a manager.

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READER RANT

My favorite activity is reading InBox, the reader feedback section of your magazine. I enjoy reading about the good, the bad and the ugly, as many lame CIOs, MBAs, SPA burnouts and other lost

WHAT DO YOU THINK?

Send your thoughts and feedback to letters@cio.com. Letters may be edited for length or clarity.

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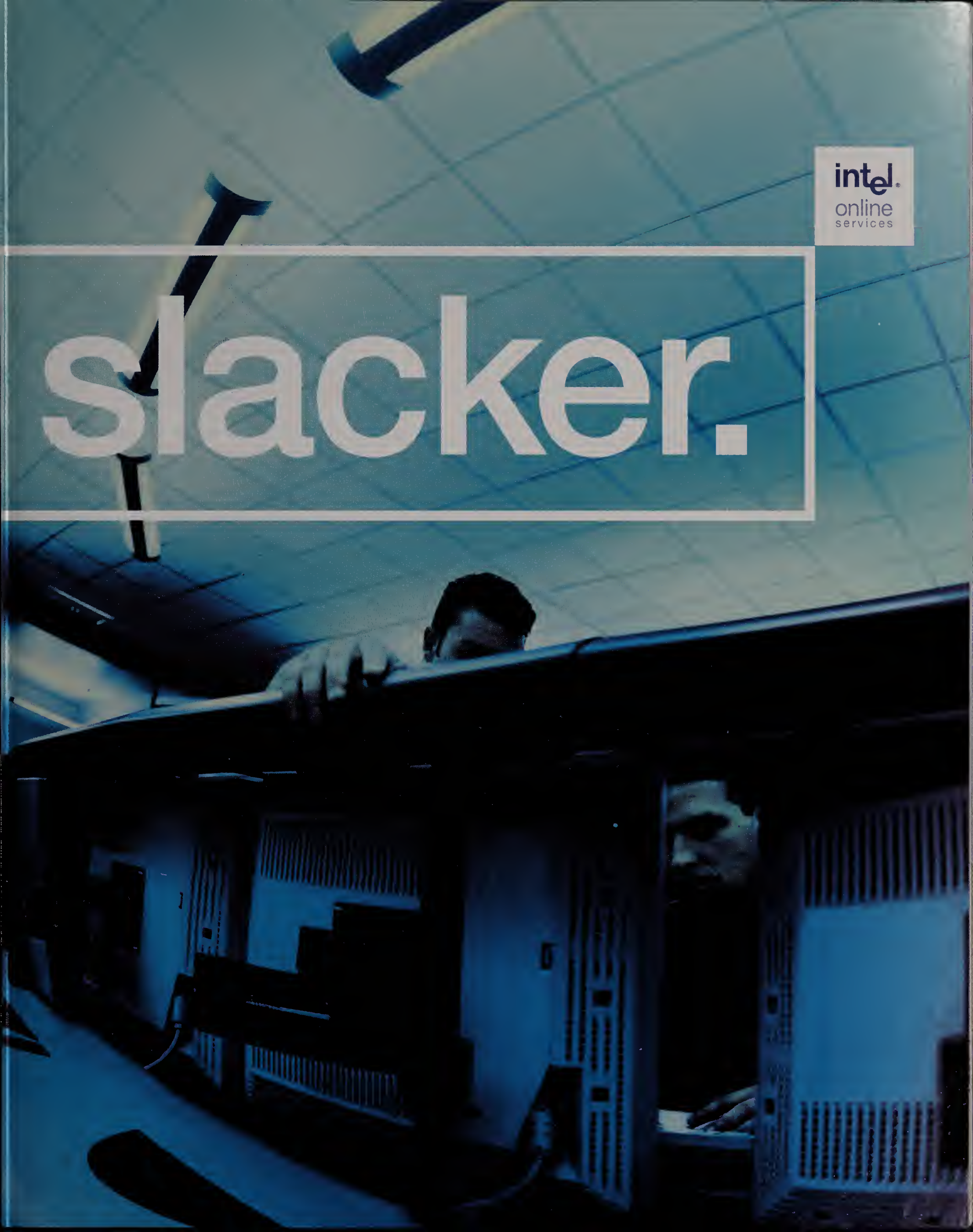
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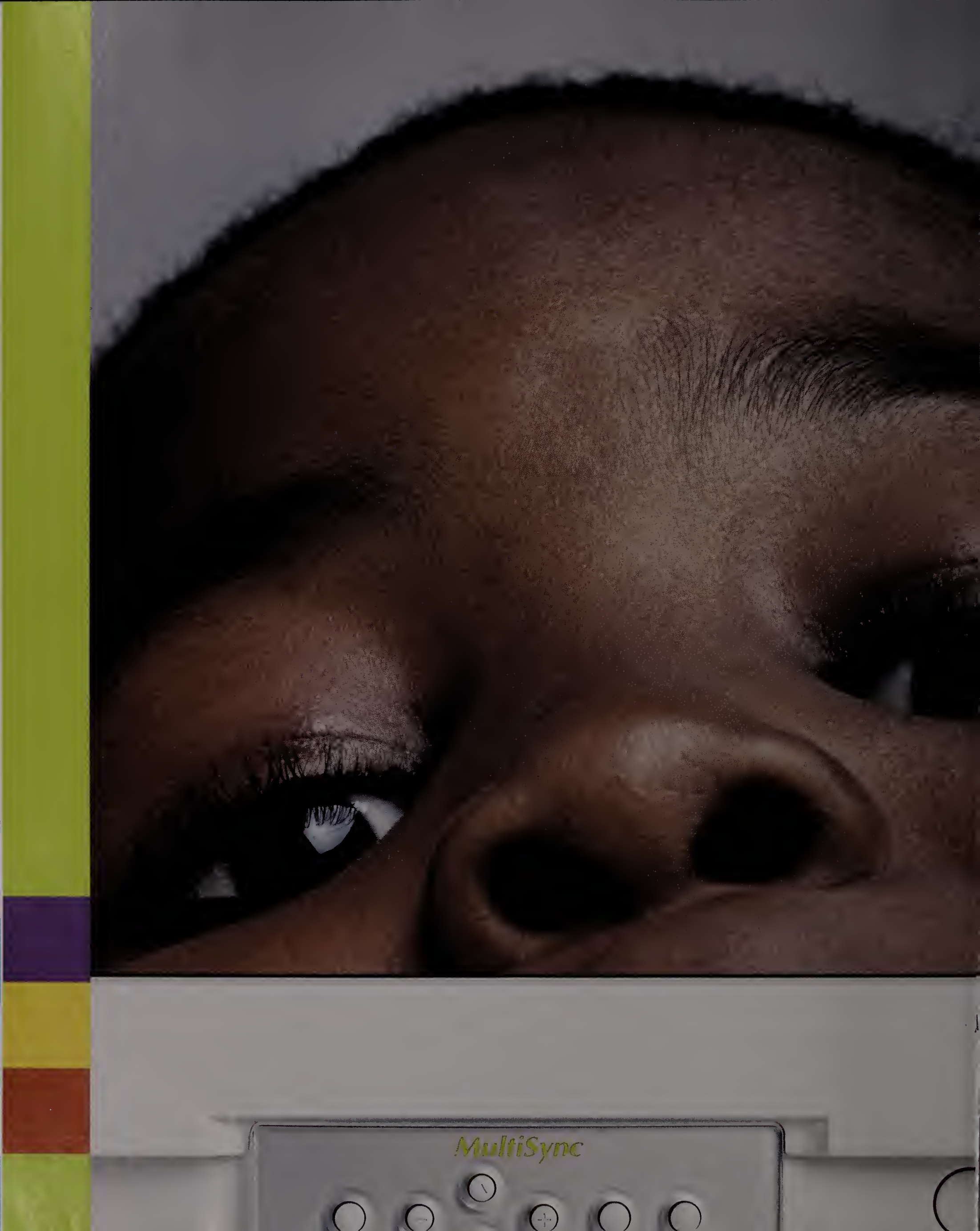
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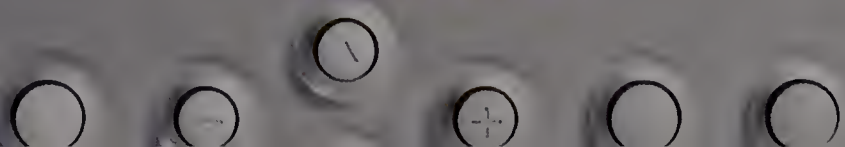
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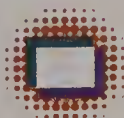
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Edited by Katherine Noyes



A E R O S P A C E

The Jet Set at Home

WHEN FREQUENT FLIERS land on solid ground, what better accommodations to make them feel truly at home than a renovated airplane?

Yes, you heard right: Max Power Aerospace, based in Smyrna, Tenn., is retrofitting Boeing 727s for use as private homes. The planes are designed to sit atop a steel column, creating a flood-free residence with a magnificent view whether on land or high above the water. The structure safely swivels to always point into the wind, thereby providing protection from hurricanes. The interior is roughly 1,200 square feet, and an average layout can accommodate three bedrooms and two baths (in addition, with the

convenient "lavatory occupied" signals, owners can say goodbye to potentially embarrassing moments).

The homes' wings are equipped with handrails to create a deck on either side where owners can wheel out the drink cart for cocktails. And though the windows are small, they're evenly spaced throughout to provide liberal lighting. However, putting down all the shades for privacy might get a little tiresome.

Pricing on the planes-turned-homes is roughly \$290,000, and Max Power is in final negotiations with one customer so far.

For more information, visit www.maxpoweraero.com.

T H E W E B

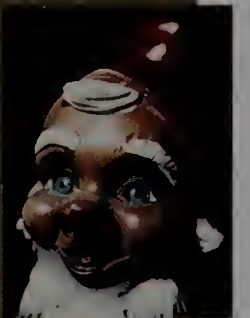
Freedom Now!

WHAT SPORTS a red hat, a white beard and a mining tool? Just ask any Frenchman: The answer is a garden gnome. France has long had a love affair with gnomes, with an estimated 12 million plastic and terra-cotta varieties decorating lawns and flowerbeds around the country. Today, the wacky little creatures are the subject of international controversy that's making its way onto the Web.

The Garden Gnome Emancipation Movement (www.menj.com), for example, is calling for a ban on all plastic gnomes, asserting that only terra-cotta gnomes have souls.

The more revolutionary Garden Gnome Liberation Front, meanwhile, is taking things a step

Continued on Page 34



"IN OUR EXCITEMENT ABOUT THE INFORMATION SUPERHIGHWAY, WE MUST NOT FORGET THE VILLAGES AND SLUMS WITHOUT TELEPHONES, ELECTRICITY OR SAFE WATER, OR THE PRIMARY SCHOOLS WITHOUT PENCILS, PAPER OR BOOKS."

—James Wolfensohn, president, The World Bank, speaking to the Economic and Social Council of the United Nations in July



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Freedom Now!

Continued from Page 32

further by "kidnapping" thousands of gnomes all over France (including about 20 from a recent exhibition in Paris) with the goal of returning them to their natural woodland habitats and freeing them from the oppression of serving as lawn decor. Related incidents have also been reported in Belgium, Britain, Canada and Germany.

For all the latest gnome-related news, visit foundus.com/jani/gnomes/welcome.html, home of the World Wide Gnome Club. Meanwhile, better keep an eye on those pink flamingos....

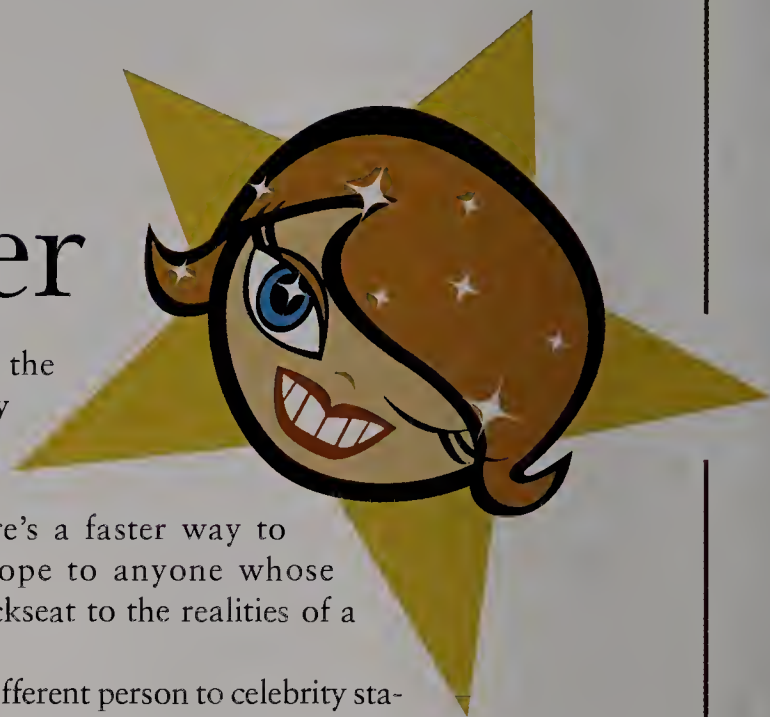
T H E W E B

Star Power

ARE YOU TIRED of singing in the stairwell, hoping that some passerby may be a talent scout? Weary of waiting to be discovered by *Vogue*? Well take heart: Now there's a faster way to stardom. A new website offers hope to anyone whose brilliant career has had to take a backseat to the realities of a day job.

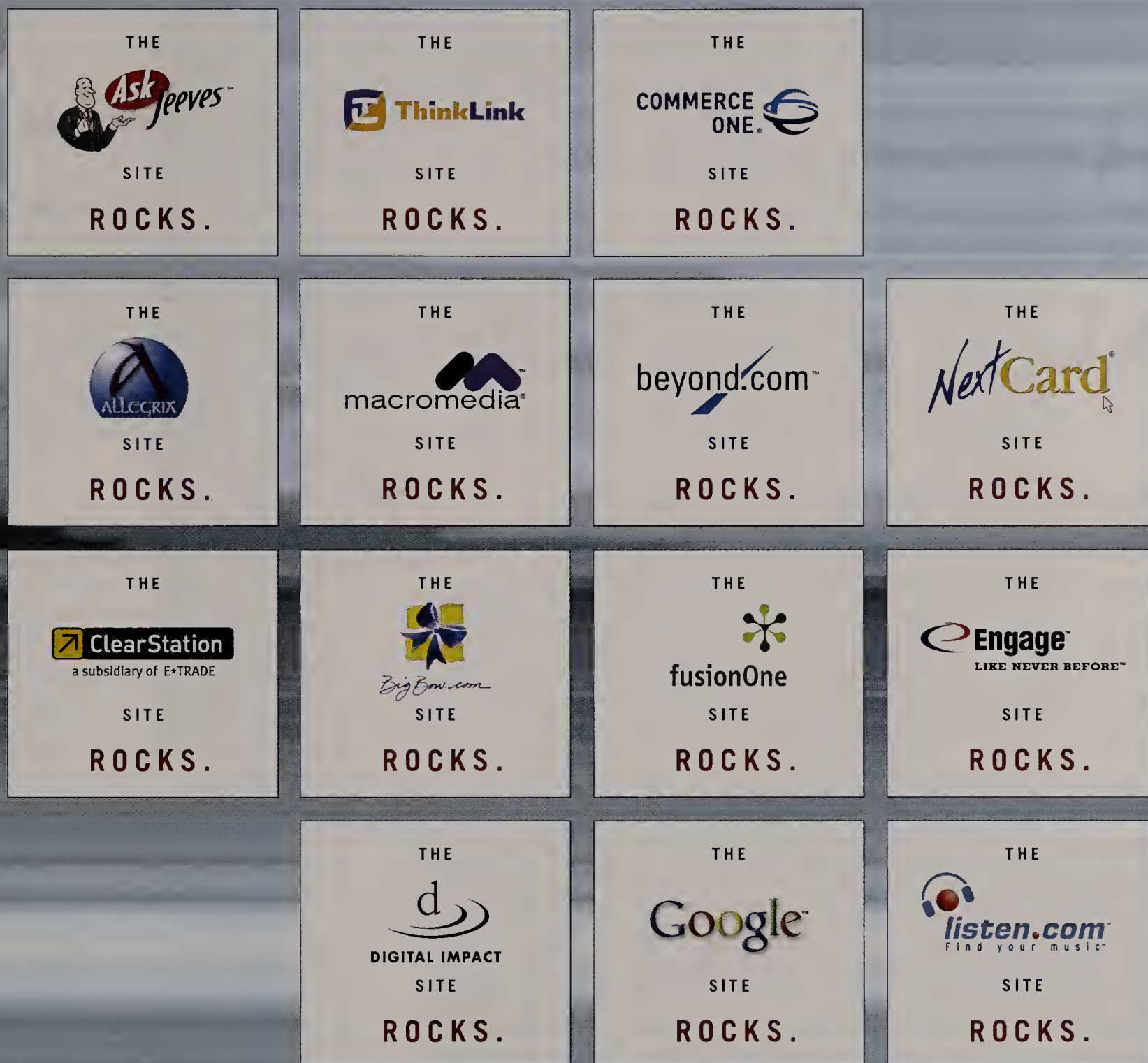
Iwannabefamous.com elevates a different person to celebrity status each day by splashing his or her picture and a short bio across its homepage. To achieve overnight success, aspiring stars simply e-mail the site their most dazzling photo and explain why, exactly, they want to be famous. Once they achieve their day in the cyber-sun, the site even lets them send and receive fan mail.

Of course, fame also has a dark side. "Sometimes fame brings big fortune," the site warns potential stars, "but other times it brings headaches." Just in case, that happens Iwannabefamous.com provides links to lawyers, bodyguards and plastic surgeons.



Maynard BY DARRIN BELL AND THERON HEIR





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By the Numbers

Compiled by
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Negotiating Telecom Costs

AS COMPETITION RAGES on within the telecom industry, corporate voice and data transmission rates are declining by 20 percent or more each year. Companies need to negotiate often with carriers to get the best deals. In a study of 15 Fortune 500 companies, the Reston, Va.-based consulting group Compass America found that those with the best rates take advantage of competitive pressures by renegotiating contracts and keeping agreements simple. "Now the playing field is more even because carriers realize that clients can get information on [competitive] rates."

Fee Categories	Best of Breed	Average
ACCESS CHARGES (voice and data)		
56 kilobits per second	\$35.00/month	\$206.63/month
256 kilobits per second	\$104.00/month	\$236.72/month
T1 (1544 kilobits per second)	\$150.00/month	\$567.99/month
FRAME RELAY CHARGES (data transmission)		
56 kilobits per second	\$50.00/month	\$175.00/month
256 kilobits per second	\$130.00/month	\$503.08/month
T1 (1544 kilobits per second)	\$380.00/month	\$567.99/month
PER-MINUTE CHARGES (voice transmission)		
Outbound Interstate		
On-On	\$0.015/minute	\$0.042/minute
On-Off	\$0.024/minute	\$0.046/minute
Off-Off	\$0.040/minute	\$0.084/minute
Inbound Interstate		
Off-On	\$0.024/minute	\$0.049/minute
(On=prepaid; Off=paying cost per minute)		

Best Practices for IT

1. Examine contracts every year. Companies that get the best rates are those that monitor their agreements closely and review and renegotiate annually. "It pays to be proactive about negotiations," Jones says. And it doesn't matter if your company isn't giant. "Some successful companies don't have hundreds of millions of minutes; they're just really good negotiators," she adds.

2. Follow the pack. If everyone else is buying frame relay services, for example, you should too. Carriers are more likely to give discounts on the popular options and will be less likely to negotiate on newer services. "If you're not getting what everyone else is, you're not in a good place to negotiate," Jones says.

3. Centralize and standardize voice and data services. Multiple network protocols can lead to a drain on network efficiency and productivity. Companies that convert all network applications to TCP/IP protocol and run a "pure" IP environment use frame relay to cut total data communication costs by 20 percent or more.

4. Award maintenance contracts selectively. Use maintenance companies that compete against product vendors. And don't extend the contracts beyond three years.

5. Centralize the process of moving, adding or changing phone equipment. This can reduce the cost of such an event from an average of \$30 to as little as \$5 to \$8.

Suggest future topics to numbers@cio.com.

"DOTCOM STARTUPS THAT DON'T FIGURE OUT HOW TO MAKE MONEY WITHOUT THE INTERNET ARE NEVER GOING TO FIGURE OUT HOW TO MAKE MONEY WITH THE INTERNET."

—Jerry Gregoire, former CIO, Dell and Pepsi

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DATA SHARING

The Song of Life?

BY ALLOWING USERS worldwide to share and distribute music for free via the Web, Napster has already made headlines—not to mention ruffling more than a few feathers—by challenging the music industry's traditional distribution system. Soon, similar technology may be used in a whole new way—to facilitate the sharing of genetic data by scientists involved in the Human Genome Project.

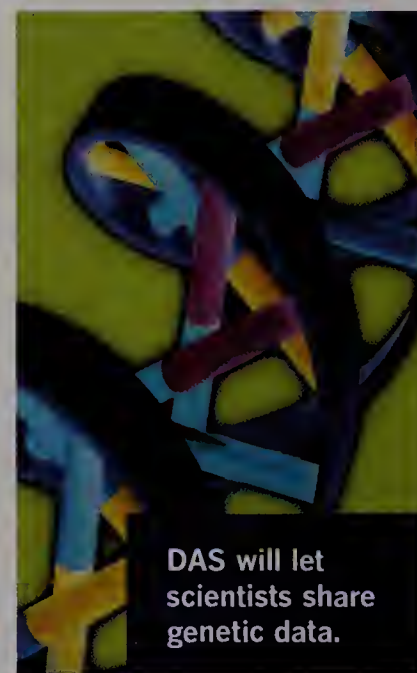
When it began in 1990, the Human Genome Project's first objective was to sequence the more than 100,000 genes in human DNA. That goal was met in June 2000. Now it's on to the next step: figuring out the interactions of the 3 billion base pairs of guanine, thymine, adenine and cytosine that make up those genes. That could take a while, especially because much of the data is scattered in the databases of scientists across the world.

Lincoln Stein, a bioinformaticist at the Cold Spring Harbor Laboratory in Cold Spring Harbor, N.Y., has proposed a way for researchers working on the human genome to share data through the Distributed Sequence Annotation System (DAS), which would use technology similar to both Napster and Gnutella, the Nullsoft software that lets users share more than just music files.

At the heart of DAS would be a centralized reference server that would hold a detailed map of the genome; researchers could then make comparisons and annotations to that map using information maintained on their own hard drives.

"About a year ago, a lot of the data was inaccessible," Stein says. "It was in paper journals or ad hoc websites. You couldn't take it [from the websites] and easily compare it because of different formats."

DAS would provide a common format in XML, which would be searchable through add-ons Stein and his team have built onto an Apache Web Server. The result? Users worldwide would be able to view relevant data from one another's hard drives.



Stein says DAS differs from Napster in that it depends on someone manually creating links to data sources, whereas Napster goes through the entire Web. As a result, DAS "won't fill up the bandwidth the way Napster does," Stein says. "We run terabytes. Napster runs tens to hundreds of terabytes."

—Joe Sullivan



NEW PRODUCTS

Out of This World

STAR LIGHT, STAR BRIGHT, first star I see tonight; wish I may, wish I might dream up a new perfume tonight.

It's doubtful that Les Small, senior perfumer at Quest International, a developer and supplier of scents for the consumer products industry, actually wished upon a star to get inspiration for his company's futuristic new fragrance, but the result—called Cyba—may actually smell like one. A star, that is—or, more accurately, a meteorite.

Quest, based in Ashford, England, developed Cyba as part of an "extensive program to create the odors of the future by tracking down new scents in strange places," says Paul Austin, the company's vice president of marketing and new business development.

To capture the aroma of a meteorite, Small and his team not only smelled one themselves but also used a technique called "head space analysis," in which a glass dome is placed over the sample to collect its odor molecules. Small's team then softened the smoky, metallic elements of the meteorite's aroma with florals, citrus, amber and musk.

The otherworldly fragrance is what perfumers refer to as a "concept fragrance," designed to provide a foundation on which other designers can base their own signature fragrances. So, alas, you won't find Cyba in stores—at least not in this galaxy.

More information about Quest is available at www.questintl.com.



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SECURITY

Cat and Mouse

IF YOU HAVE a power protector and the latest virus-scanning software, you may think you've got your home office covered. But watch out: If you have feline friends, you could still be in for a surprise.

Sometimes your computer keyboard is the quickest route from point A to point B on a cat's mission of vital if well-concealed importance. Cute as that may be, the result often isn't. Lost data, incorrect data inputs or crashed systems are just some of the hazards posed by wayward paws. To the rescue comes BitBoost Systems (www.bitboost.com), a Tucson, Ariz.-based company that offers cat detector/cat repellent software called PawSense for Windows- or NT-based PCs.

How does the software work? According to BitBoost, cats have a distinct pattern of "typing" when they walk across a keyboard. PawSense is programmed to distinguish the pattern of paws from that of human fingers. After one or two steps, PawSense will detect the presence of a furry culprit. The software then blocks all keypad input and emits a sound—such as that of a harmonica or hiss (you can also record your own)—that cats find annoying. PawSense is available from BitBoost's website for \$19.99.



MARKETING

What's In a Name?

BACK IN JANUARY, Halfway, Ore. (population 345), was rechristened Half.com at the request of a Conshohocken, Pa.-based Internet company of the same name. The town agreed to change its handle for a year in exchange for computers and cash.

City Planner Patti Huff reports that the company donated 20 computers to the grade school, one to City Hall for community use and one to Head Start. It also set up a website for the town and hired a local webmaster, and gave \$75,000 toward community revitalization as well as a donation to the Baker County Fair and Panhandle Rodeo.

But the town is still recognizable to its loyal residents. "The name change is by proclamation only, so we didn't legally change it," says Huff. "The only noticeable difference is a new sign when you drive into town. And the letterhead is a little different."

HOT TOPIC



E-COMMERCE

Greasing the Wheels *By Lee Pender*

The World Wide Web is not always as worldwide as its name suggests, especially in the realm of global e-commerce. Sure, a customer in Iceland can go to a U.S. company's website and place an order, but will the order ever arrive? With the complex web of tariffs, trade restric-

tions and customs regulations that encircles the globe, the seemingly simple act of shipping an order abroad can be next to impossible. And as online exchanges continue to explode, global commerce is becoming an even more pressing problem.

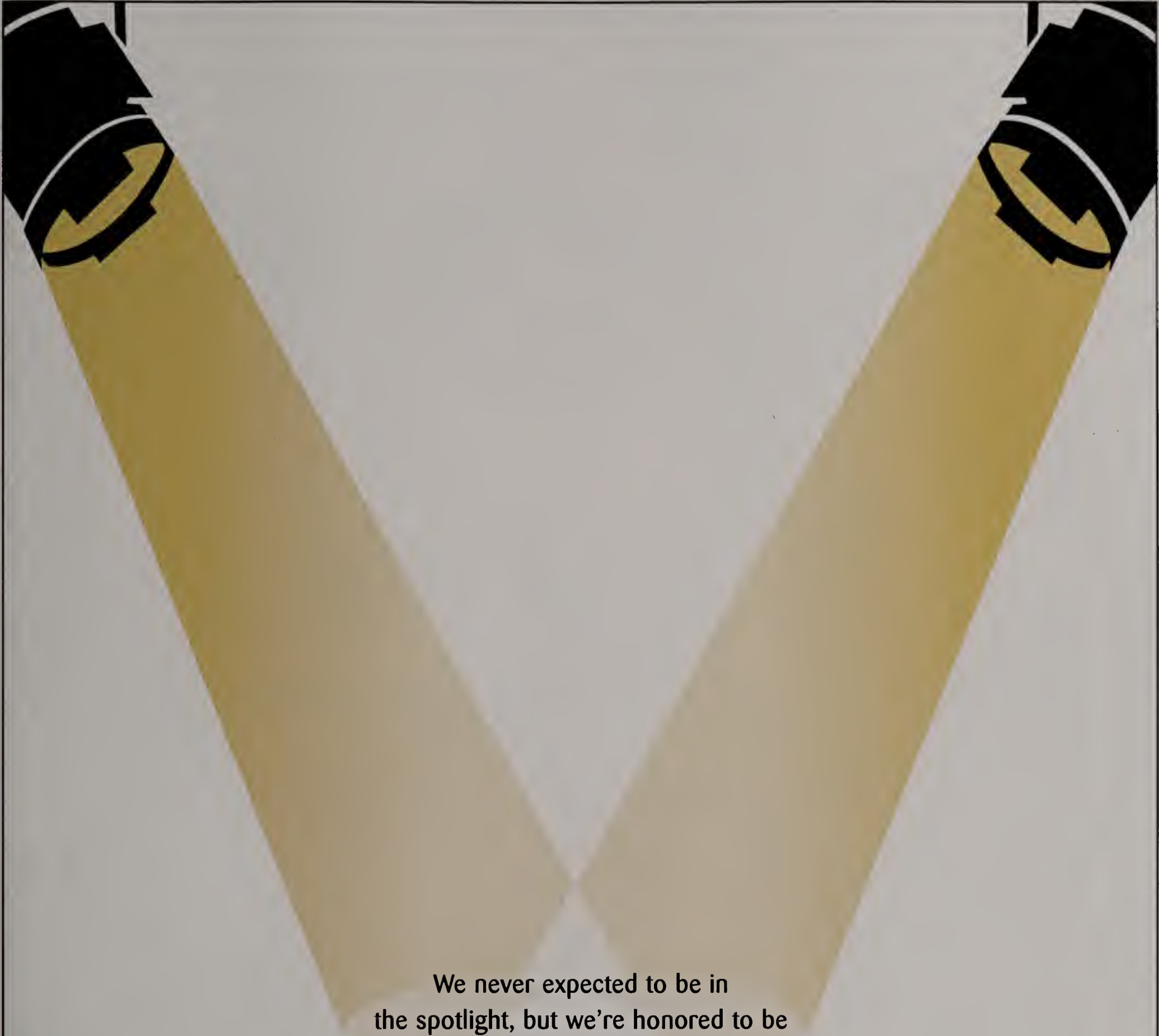
But where there's a problem, there's opportunity, and two companies are out to ease the hassle of sending and receiving items worldwide. The newer of the two is myCustoms (www.mycustoms.com), a Menlo Park, Calif.-based vendor that promises to provide a streamlined process for companies

looking to transact business in countries around the world.

"We're providing a service that allows any company to trade globally," says CTO Jay Shen. MyCustoms helps companies toward that end by calculating, for each transaction, requirements such as value-added taxes and duties, and then generating required forms both electronically and manually.

While myCustoms is obviously targeting small companies that do not have international business processes in place, Shen says larger businesses can also use the service to boost efficiency in shipping and receiving items internationally.

MyCustoms is not alone, however. New York City-based ClearCross (www.clearcross.com) actually beat it to the international punch. The company's ClearCross Network technology offers functionality that includes calculating shipping and duty costs, creating documents, monitoring compliance standards and tracking shipments.



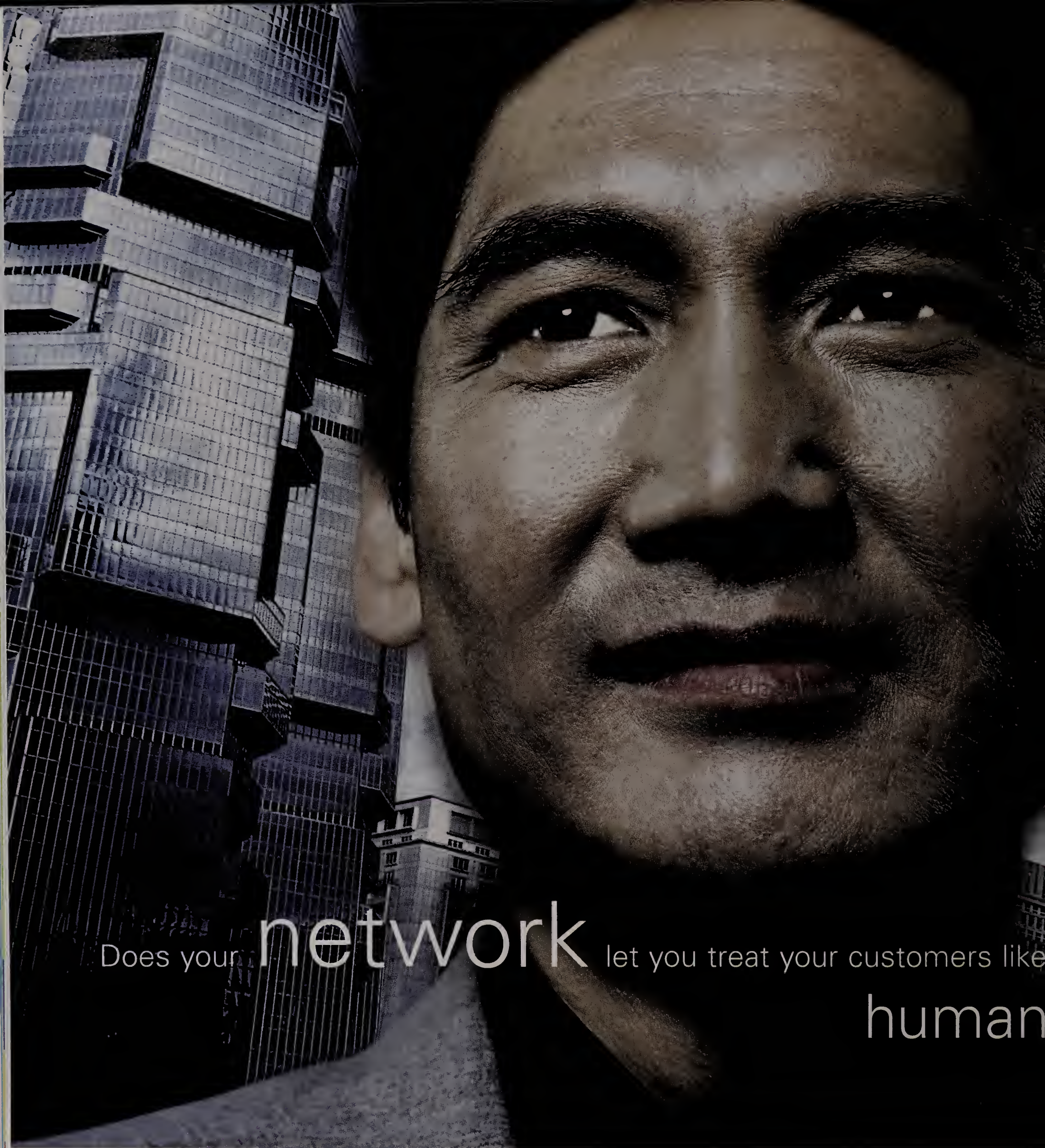
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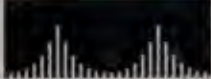


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On the Move

Compiled
by Tom Field

Gillotti Leaves Starbucks for Startup

DEBORAH GILLOTTI, former CIO of Starbucks Coffee Co., has joined Seattle-based Internet company Viathan Corp. as its new COO.

Gillotti, who first joined Starbucks as CIO in 1997, had recently been promoted to senior vice president in charge of Starbucks' new e-commerce efforts. But the more she got involved in Internet activities, the more she got the itch to get in on the ground floor of a startup. So, on the advice of venture capitalists who were high on Viathan, Gillotti signed on to lead



Deborah Gillotti

Gillotti, who started work at Viathan in May. "My charter is pretty much to look at the entire organization and market-

this new company, which focuses on developing new Web products to enable database scalability.

"It's a unique opportunity to have a fairly significant impact on a startup organization," says

place" and direct Viathan's growth.

Founded in 1999, Viathan develops middleware and software products that enable Internet companies to easily manage the exponential growth of Internet data. Currently, the company's products are in beta testing, aimed at a fall release, but Gillotti already sees ways to employ her past experience. "I have a customer's perspective from being a CIO," she says, "and I also understand the requirements to build and grow an organization."

A former consultant, Gillotti possesses the business and communications skills necessary to get a new enterprise off the ground. The stretch for her is participating in a new product launch. "The product marketing side and product development are new to me," she says.

Prior to Starbucks, Gillotti spent more than three years at Duracell International, directing the overhaul of the battery company's supply chain management system. Before Duracell, Gillotti was an IT consultant for KPMG Peat Marwick, working for such blue-chip companies as Revlon and Gillette. She began her career as a statistical analyst for the International Monetary Fund.

Player's Guide

Bruce Walker → **Internet Venture Works**

Walker has signed on as CTO at Internet Venture Works, a Waltham, Mass.-based startup aimed at helping other e-commerce ventures succeed. In this new position, Walker will be responsible for the company's overall architecture and IT investment decision making. Walker is a former IT veteran at Sun Microsystems.

John B. Kelly → **Intel**

Formerly director of the Government Information Technology Agency of the state of Arizona, Kelly has resigned from that post to join Intel's government relations office in Chandler, Ariz., as government affairs manager, effective May 1.

John McCormick → **RCN Corp.**

McCormick has been appointed vice president of strategic development in the IT department at RCN Corp., a telecommunications provider based in Princeton, N.J. Previously, McCormick was vice president of information systems at Toys "R" Us. In his new role, McCormick will be responsible for operations support system development, decision support systems and IT services. He will report to CIO Eileen Gabriel.

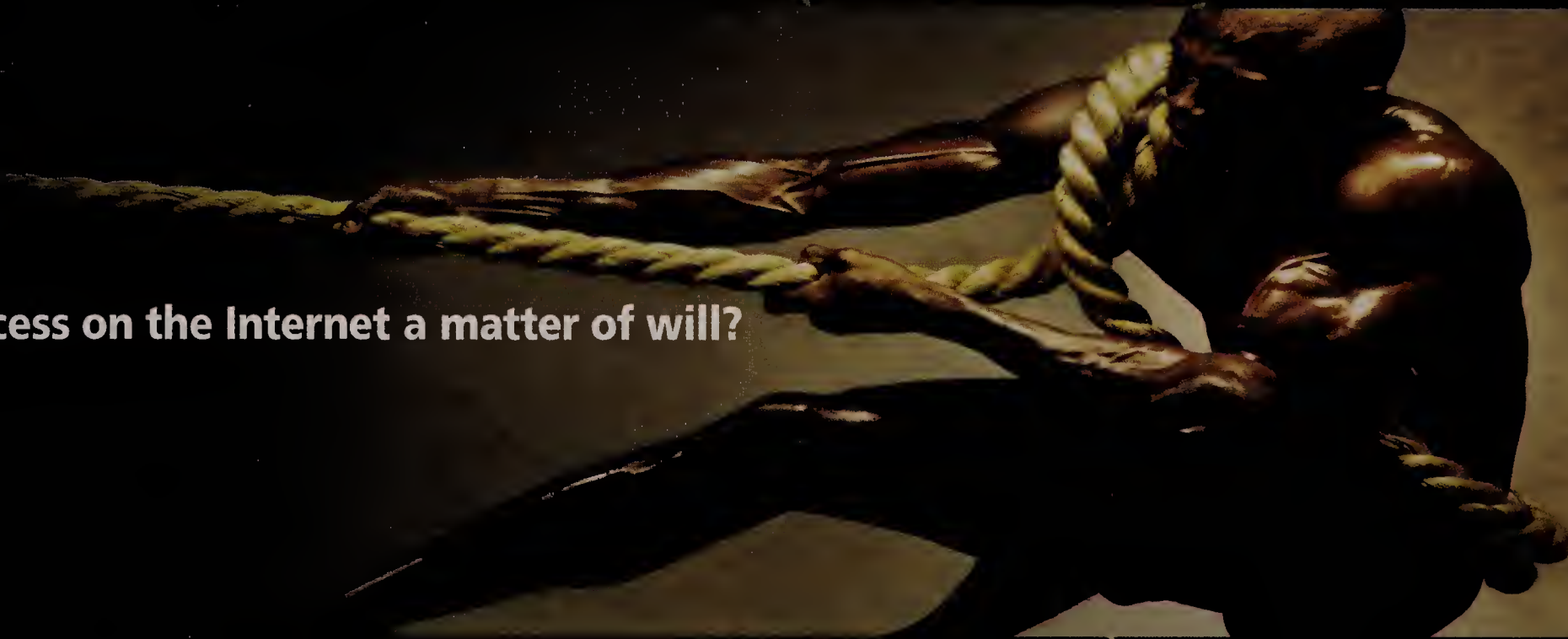
Thomas S. Powell → **BuyTrek**

Formerly CTO of Realestate.com, Powell has joined BuyTrek as its new CTO. Powell will be responsible for developing and overseeing the entire IT infrastructure at BuyTrek, an Atlanta-based e-commerce startup.





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ELECTRONIC PUBLISHING

Home Sweet Newspaper

HUMAN BEINGS ARE creatures of habit. For most of us, there's something reassuring about familiar patterns and routines—especially when we're away from home. Take the simple act of reading the morning newspaper. At home, it can be a calming and predictable way to start the day. But when you're on the road, having to navigate an unfamiliar paper can be a lot less relaxing. What to do? Today two organizations are making it easy for travelers to get their hometown newspapers—on the same day those papers are published—even while they're away from home.

NewspaperDirect is a service for hotel guests. When arriving at a participating hotel, travelers can request any one of 17 newspapers when they check in. The fee is between \$2 and \$4 per paper. When they wake up in the morning, an 11-by-17-inch, black-and-white, high-resolution edition of that day's morning paper—on paper—is waiting for them.

Behind the scenes, late at night, newspaper publishers send a PDF file of the next day's paper to NewspaperDirect's FTP site. From there, it is passed through the New York City-based company's network and along to print stations at individual hotels. Each copy is printed by high-speed printers, collated, stitched and personally addressed to the reader. For more information, visit www.newspaperdirect.com.

PressPoint's operation is simi-

lar. Travelers visiting New York, Washington, Chicago, San Francisco, London, Hong Kong or various cities in Brazil can choose from almost 50 out-of-town papers that PressPoint currently offers for delivery the same day the paper comes out. PressPoint, based in

New York City, also sends its papers to retail outlets including newsstands, airports and cruise ships. In the United States, each paper costs \$2.50 per day. For more information, visit www.presspoint.com.

—Stewart Deck



HOT TOPIC



LEADERSHIP

This Time with Feeling

By Ben Worthen

The business bestseller list is littered with books offering everything from *12 Principles of Leadership* to *101 Ways to Motivate Employees*. But if leadership is simply a matter of mastering a few "can't miss" techniques, couldn't any cubicle-dweller cobble together enough of a smile and a sincere-sounding greeting to become an effective manager?

Leadership consultant Peter Koestenbaum, founder of Philosophy-in-Business in Santa Monica, Calif. (www.pib.net), doesn't think it's that simple. "Leadership is essentially a decision that I make to be moral and loving and understanding," he explains. "Figuring out how I can make an impact is not a technique; that is a decision." According to Koestenbaum, good leadership is the offspring of self-contemplation—something no book can deliver.

Like most intense introspection, leadership potential can be fostered, but the individual must make the final breakthrough on his or her own. And it can't be faked. To be a leader, you must "genuinely care about people," Koestenbaum says, "not because it is good for business, but because you care. People react negatively to manipulation and insincerity."

The emphasis on feelings may seem out of step with the bottom-line focus of most businesses. However, University of Chicago Graduate School of Business Professor Marvin Zonis agrees that it's time to get emotions back into the workplace. Given the relative dearth of sustainable competitive secrets, he argues, a company's greatest asset is the quality and the commitment of the people who work for it. And the most effective way to mobilize employees is by making emotional connections. "People don't do something for intellectual reasons," Zonis says. "They do it because it feels great."



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INTERVIEW

Where MBA Means Martial Business Arts

THE SAME INSTRUCTIONS that helped Ralph Macchio's character stand up to Johnny in *The Karate Kid* might help businesspeople face different kinds of challenges. Take it from Marc Trezza, management consultant, executive coach and president and CEO of Search Net Corp., an executive coaching company based in New York City.

Trezza, who began studying martial arts at age 9, sees similarities between the principles of martial arts—determination, speed, tactics, patience, strength and focus—and the keys to successful business dealings. He applies these principles in his work, helping clients understand and use them in business settings. *CIO* spoke with him to learn more.

Q: Why do businesspeople need these principles?

A: One of the biggest problems I see [in the business world] is that the inability to effectively handle stress causes people to make poor business decisions. The natural reaction is to fall back into a demand for rigid compliance, where complying with a manager or

owner becomes more important than actually accomplishing the task. That's a very difficult flaw to recognize. So creating a balance and an ability to step back becomes important.

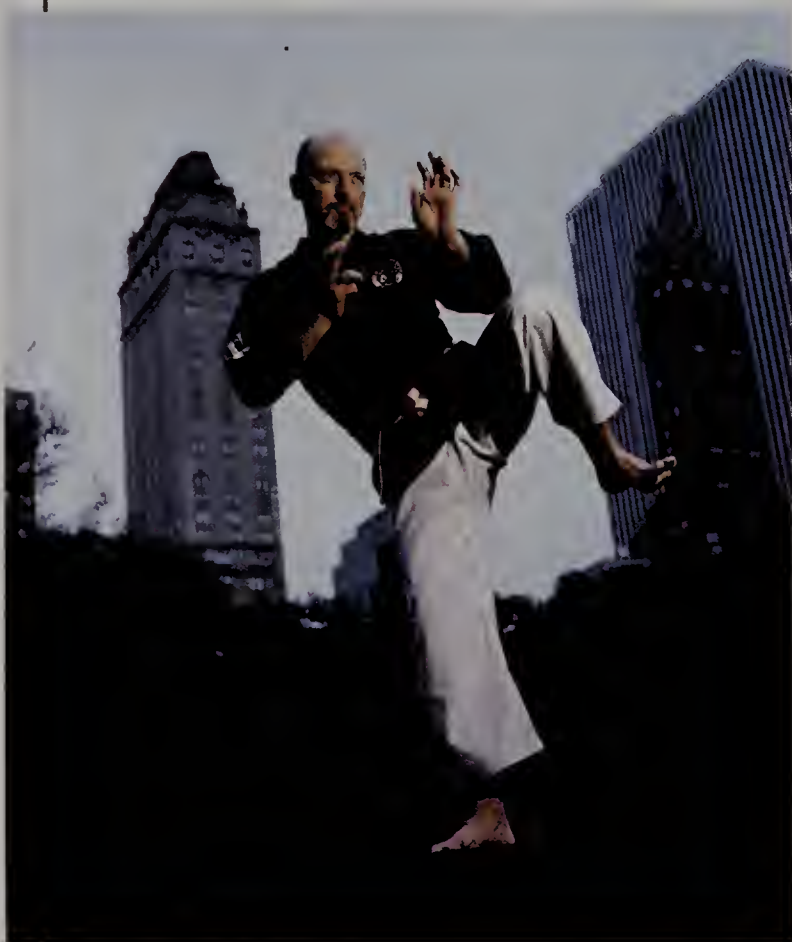
Do you need to know karate to apply the principles to the business world?

I recommend that everyone learn martial arts. But you don't need to. One of the good things about martial arts is that it takes a lot of junk and boils away what's superfluous. We're taking those principles and applying them to the business world.

What are some of the key martial arts principles that apply to the business world?

One of the key principles is fluidity—avoiding predetermined responses. The principles are all manifested in different ways in different issues. There's a point in your studies where those who do master the art just get it, and once you get it, it becomes a part of you.

—Meg Mitchell



Happy (Innovation) Trails

THOUGH SILICON VALLEY may hold the leading place in high-tech lore, the city of Boston is no stranger to technology, and now it's aiming to show off its successes in that arena. This past spring the Boston History Collaborative, a nonprofit government, business and tourism alliance, launched the Innovation Trail, which aims to highlight Boston's most stellar innovations.

Akin to Beantown's Freedom Trail—a self-guided walking tour that winds its way through such historic sites as the USS Constitution—the two-and-a-half-hour, bus-driven tour departs from Boston's Back Bay. From there, tour-goers head to the Pioneer Telephone Museum at City Hall Plaza, the site where Alexander Graham Bell invented the telephone.

Other stops include GTE, formerly Bolt Beranek and Newman, where e-mail was invented; and Genetown, USA, the center of genome research at MIT's Whitehead Institute, Genzyme and Biogen. Robert Krim, executive director of the Boston History Collaborative, says there are about 25 potential sites to visit, and each tour can be crafted to suit the group that is taking it.

The tour is now available to groups and organizations; it will open to the public in February 2001. Tickets are \$25 for adults, \$18 for students and seniors, and \$11 for children. Visit www.innovationtrail.com.

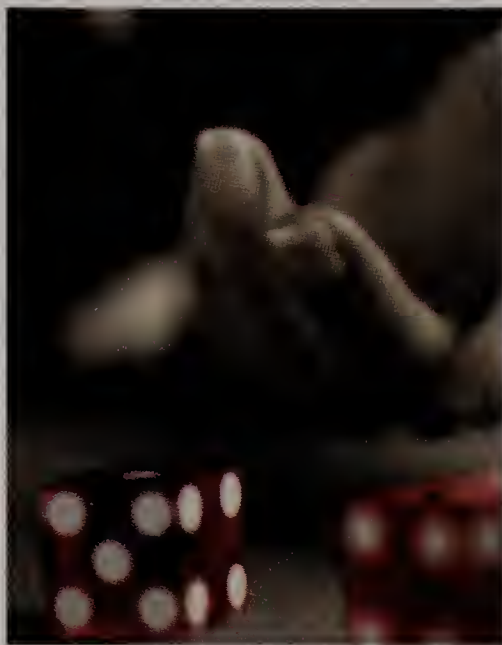
—Tom Wailgum

Strategy



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Reality



Which 5: TBD

Solution



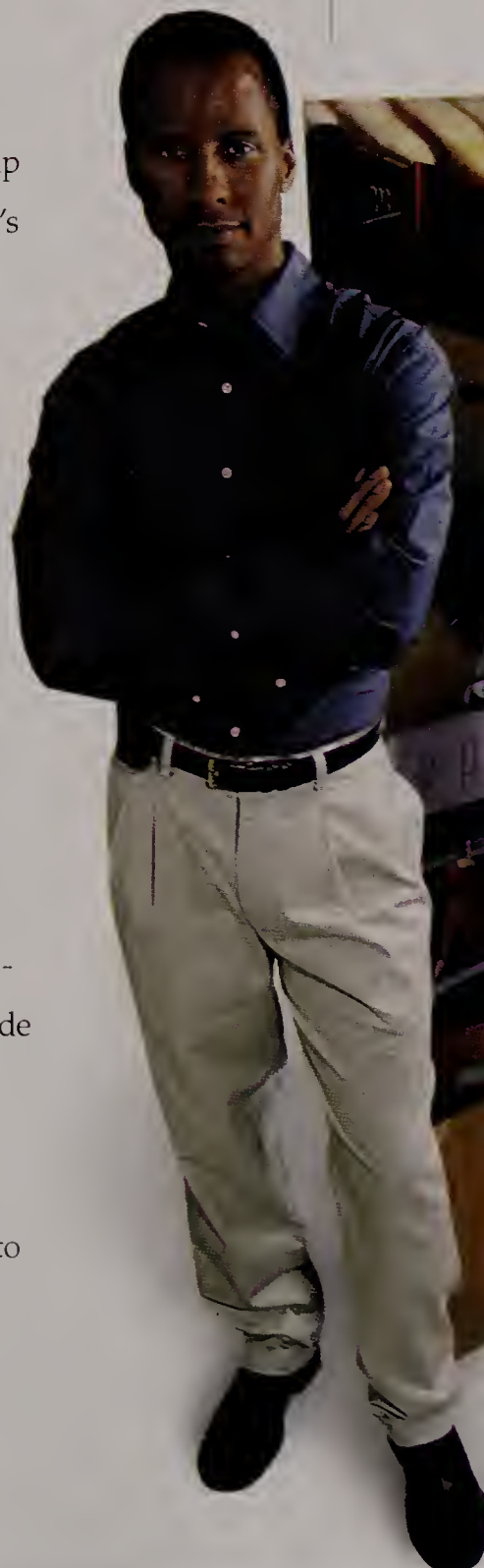
The sell-side @dge

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Davenport On...

Unfriendly Hosts

Telecommuting is supposed to be easy, but we all know it's more often a remote impossibility

BY TOM DAVENPORT

I AM EXPERIENCED. At IT, that is. I'm not trying to brag, only to indicate that when I have problems with information technology, it's not because I'm technically incapable. I had one of the first PCs and one of the first laptops and still have a Palm I. At one point I was a systems administrator (though, admittedly, it was a couple of decades ago).

Having job-hopped a bit and hung around lots of universities, I probably worked on more than a hundred different computers over my life span. I have never spilled a Coke into my keyboard, never used my CD-ROM drive as a cup holder, never sought the "any" key in response to the "press any key" prompt.

But I am perplexed. By remote communications, that is. This morning, for example, I decided that I would work from my vacation house on Cape Cod. I wanted to start the day bright and early by replicating my Lotus Notes messages. I connected successfully at first (to a local number in my own little town, which I happily observed was added to the phone listing since last summer), but Notes couldn't find my server. Rebooted. Dialed up again.



The modem hissed, quavered, yelped, barked, twanged and made a few sounds I don't remember ever hearing before, but never settled down and got quiet the way it's supposed to. I tried a few more times. By that time, I realized that I had spent 40 minutes doing all this, and it was no longer bright and early. Dialed up technical support. Was told it was a system problem. Guess I was oddly reassured.

I tried to do the same thing last week. That time it didn't work then either. (OK, I forgot my modem-to-phone-plug cable—but wouldn't you think that some store on the Cape should carry such a pedestrian item?)

The point is, I have failed to connect hundreds if not thousands of times over the years. I have failed at home and all around the world. I've failed from dirty phone booths (the ones in London are particularly dirty, if you catch my drift) and pristine luxury hotel rooms. I have failed at 110 volts and 220

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volts, with every kind of adapter you can imagine. In short, I am a remote access loser.

Blame It On the System

Has any of this affected my self-worth in the slightest? Do I blame myself for this orgy of wasted time, for the endless busy signals and “the port was disconnected by the remote computer” messages? I do not. The only stupidity I feel is for enduring it all—for not chucking these computers and becoming a gentleman farmer. Or for not being a stay-at-home novelist who hands in his completed manuscripts in longhand or, at best, on a diskette.

We've cracked the genetic code and removed the blinking clock from our VCRs. Yet dial-up communications are no more reliable than they were when I had a Radio Shack TRS-100.

No, I blame the system—the vendors, the IT establishment, the trilateral commission. I know it's not just me, because my colleagues and friends admit to similar difficulties. My buddy Dave DeLong, for example, reported huge problems in this particular area last week during a coffee-machine conversation we were having. I promised to mention him if I wrote about the issue.

Still, I know it's not just my company, in part because our IT people are smart and hardworking, but also because I've had these problems wherever I've been employed. And I know it doesn't have to be this way, because some organizations are able to get it right.

Take America Online, for example. Sure, the company had a few problems with busy signals a few years ago. And my wife and kids have an occasional problem with a dropped connection. But in general, AOL supplies its cheery “You've Got Mail” almost anytime anyone dials up, as the movie e-mail correspondents Tom Hanks and Meg Ryan can attest. Imagine the fate of their love affair in *You've Got Mail* if they had been dealing with busy signals, line drops and incorrect protocols? There is nothing very exciting or interesting about AOL; it just works.

I also have a cable modem at home, and it works perfectly—all the time. It is such a relief not to have to dial up that I am willing to use multiple e-mail systems, to risk hackers getting a hold of my computer from afar and to pay an exorbitant \$50 a month to use this device. It is faster than a 56K modem, of course, but to me the speed is less important than the con-

venience and the reliability. It's like being in the office, except that you can't get through the corporate firewall. Well, supposedly there is a way to do that, but I prefer to write books and be a Little League coach (even though we were 3 and 13 this year) over having the world's best home office setup.

That's really the choice in today's world. I have no doubt that I could overcome my problems with remote access and raise my connecting average to somewhere over Nomar Garciaparra's. But I'd rather have a life. I don't really have the time to tinker with all the little switches and parameters and error message interpretations.

It should all just be simpler. How much television would we watch, for example, if we had to dial up before we tuned in? What if we had to worry, for instance, about whether our baud rate was sufficiently speedy to download *The West Wing*? Or would we redial if we kept losing our connection to *The Practice*?

One would think that this technical problem would pale in comparison to others our society has solved. After all, we've

cracked the genetic code, solved Fermat's Last Theorem and removed the blinking clock from most new VCRs. Yet dial-up communications today are no more reliable than they were when I had a Radio Shack TRS-100 at the end of my phone line. Apparently we have topped out in terms of dial-up modem speeds (I must say, it's hard to believe that 56K is the result of an immutable law of physics), so perhaps now we can concentrate on actually connecting.

Advice to the Weary

I guess I'm supposed to be constructive in these columns, so let me venture a few words of free advice to CIOs and other denizens of the corporate IT establishment. Do whatever you can to make life easier for us remote communicators. We don't need anything fancy, we just want our e-mail. Now that server and general computer reliability are pretty high, devote some human resources to working out the bugs. And offer a special service for mobile executives who want to bring in their laptops for a telecommuting tune-up.

I just tried to dial up again. I did get a connection! But again my hopes were dashed: “The Notes server is not a TCP/IP host.” Somehow I received 29,709 bytes without accomplishing anything at all. It's fascinating to have such precision about a failure to communicate! **CIO**

Tom Davenport cogitates at both Andersen Consulting's Institute for Strategic Change and Babson College. He welcomes reader comments at davenport@cio.com.



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Ask the Expert

We're Not Experts on This, but We Know Someone Who Is

Shopping Around

Gordon Jones, former senior vice president and CIO of Santa Clara, Calif.-based Beyond.com (now CIO and CTO for Toysrus.com), answered readers' questions on CIO.com about his area of expertise, online retailing

Q: I am currently working for a dotcom, and I have experience in merchandising and inventory controls. How can my company manage customer satisfaction (efficient customer response) without inventory?

A: I suggest you take proactive and reactive approaches. Proactive—try to be better than your competition in terms of uptime and response time. Ensure that your site has a high “stickiness” and measure users’ activity (what percentage use the search feature, for example). Before launching a new design, get user feedback and make modifications accordingly.

Reactive—conduct surveys to measure your customers’ happiness, identify ways that customer service can be improved, know the FAQs and post them on the site. Drive projects to continually improve the customer experience—over time this will be the key differentiator.

Q: What are the positive and negative implications of the Internet revolution on our society, and what technology future do you foresee?



A: Positive: The Internet is becoming a ubiquitous cornucopia of knowledge and a global trading vehicle. Companies are reducing costs by providing information through a publish-and-subscribe model and reducing the amount of paperwork, as well as enabling Web transactions. The Internet is also encouraging people to communicate more remotely with friends and family around the world (IT helps me communicate with a former boss and friend who is unable to speak because of Lou Gehrig’s disease).

Negative: It behooves all of us to ensure that we minimize the number of people who are digitally disadvantaged. We should encourage the proliferation of public Internet kiosks, in the same way telephone call boxes were set up in communities that could not afford individual phones. There is also a fine balance between controlling the Internet and privacy, security and protecting children from inappropriate material.

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Ask the Expert

As far as affecting the future, I believe we are only at the tip of the iceberg. More demands will be placed on companies to make their information available in real-time over the Web. Most of the barriers to more widespread use of the Internet will not be because of technology or expense but will be caused by political debates concerning security, privacy, international, cultural and taxation issues.

Branded brick-and-mortar companies will move online and be successful because they do not have to spend a lot of money to build a brand.

Q: What do you envision as the future of e-tailing?

A: Branded brick-and-mortar companies will move online and will be even more successful because they do not have to spend a lot of money to build a brand, like most of today's large dot-com e-tailers have had to. These branded manufacturers will likely outsource their e-commerce functions.

Q: What should brick-and-mortars do to prepare for e-tailing?

A: Many manufacturers are realizing that e-tailing is not their area of expertise or their core competency, so they are evaluating outsourced solutions. Companies have to weigh the costs of spending their IT time and resources on building and maintaining a site against outsourcing it at a minimal cost. One should leverage an outsourcer's experience rather than re-inventing the wheel. In addition, when making that out-

sourcing decision, be sure to look for someone who will be your partner through the entire process and provide ongoing support.

Q: How do you go about evaluating an e-tailing website?

A: A great Web store has two components—a great front-end user experience and a fully integrated back end that provides for a seamless buying experience. The front end includes site design, navigation, marketing and merchandising, interna-

tional language and currency capabilities. The back end involves transaction processing, fulfillment, distribution, customer support, reporting, security and fraud screening.

Q: What is the hardest part of starting an online retail operation?

A: Making sure the back end—the processing after the order is taken—is well integrated and functions smoothly so that the customer has a positive buying experience. This involves everything after the Buy button, including credit card processing, fraud screening, tax calculations, fulfillment, physical or digital distribution, customer service and reporting.

Q: For a traditional brick-and-mortar company that uses a direct-sales approach (marketing to customers directly in their homes), what would you suggest for addressing the channel conflicts that selling via the Web presents?

A: We have been building Web stores for traditional brick-and-mortar companies through eStores by Beyond.com. Although we're not directly involved in the channel decisions, it is important for each company in the channel to ensure that they are adding value to the process. The Web may become the only order-processing vehicle for many companies, whereby discounts are established up front based on volumes, purchases or special services provided.

Q: How do you get customers to your site, and then how do you keep them coming back to you and not someone else?

A: More established brands are leveraging their name recognition—visitors go to their site because they are already familiar with the company and the products. We have learned that these companies can do much more targeted ad campaigns to draw people to their sites.

To improve customer repeat rates, it is imperative that users have a positive customer experience. This involves the complete trading cycle—a fast response time on all searches and a fully integrated system that can extrapolate information. A robust, fully integrated back end is critical. The site needs to maintain a high uptime and be fully functional when customers visit, the order must be processed and delivered correctly, the credit card information must be captured securely, and customer service should be readily available to clients. **CIO**

If you would like to recommend an expert for this column or suggest a topic, e-mail Senior Writer Daintry Duffy at dduffy@cio.com.

Ask the Expert

Have a question about **ERP**?

Barry Wilderman, vice president of application delivery strategies for Stamford, Conn.-based Meta Group, will be available to offer insight and advice on how to get the most from your ERP system and how to avoid the many pitfalls of an ERP implementation. Post your questions for him through Sept. 15 at www2.cio.com/CIO/expert or e-mail questions to asktheexpert@cio.com.

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Total Leadership

Lose the “E”

While the Internet era certainly makes new demands on leaders, “e-leadership” is not the answer

BY CHRISTOPHER HOENIG

THE LETTER “E” is popular today. Placed before otherwise mundane terms, it can catch attention, create superficial buzz and signal a next-generation idea. So, it seems, goes the thinking behind the notion of the “e-leader.” There is a barrage of “e-leadership” approaches being promoted, all of them with the message that leadership in this Internet age has only a faint resemblance to the leadership of yesteryear. Our era does present new challenges for leaders, but in this case, I don’t think we need the “e.”

Throughout history, whether it was the agricultural, industrial or information revolution, a new type of leadership has always been required to solve new problems and take advantage of new opportunities. Charting a course through changing conditions is an important part of what defines leadership. So it is today. Some changes are clearly making new demands on leaders. At the same time, though, other areas have stayed much the same.

Trying to comprehend and internalize the many glitzy e-approaches to leadership can not only distract you from fundamentals but can also make your focus superficial, driven by



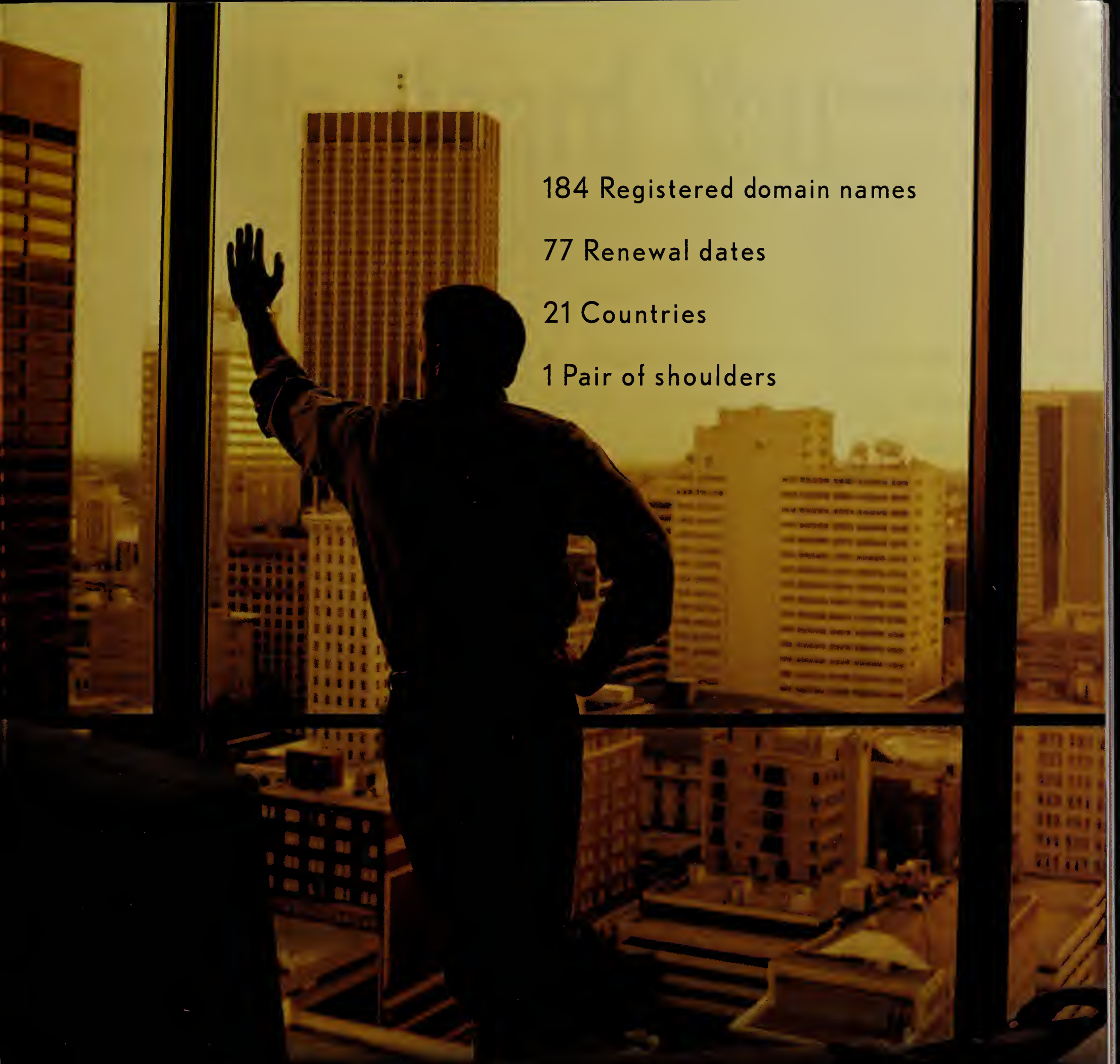
jargon rather than substance. Instead, let’s take a hard look at what’s changed fundamentally, what’s changed by degrees and what’s stayed the same.

What Hasn’t Changed at All

The one thing that hasn’t changed in this era, or in any other for that matter, is the character of people. People invent technologies. People solve problems and identify opportunities. Leadership is about choosing the right people and helping them be successful in creating change. Leaders have to recognize, attract and retain other leaders and help them gain the position and freedom to demonstrate their leadership.

As chairman and CEO of a new B2B Internet startup, I made no decision more important than choosing the people to help me start and grow this enterprise. I looked for individuals with what I call the five C’s: character, competence, contacts, chem-

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1 Pair of shoulders

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Total Leadership

istry and commitment. And most of all, I looked for leadership—people under whom I'd be honored to serve and who would challenge and complement me every step of the way.

There are a number of timeless reasons why people are such an important aspect of leadership:

- People still have variable abilities to cause and adapt to change. Leaders help break new ground, develop the best play-

You can be an a-leader, b-leader, c, d or e-leader, but you'd better be a leader of people first, cooking up alphabet soup last.

ers on a team and smooth the path for the others to come along.

- People still need to believe that what they are doing makes a difference. Leaders help to articulate and communicate not only where an organization is going but how to get there.

- People still need to feel cohesion and a sense of collective identity as they pursue an adventure. Leaders are the ones who help to catalyze that shared feeling, image and set of values.

- People respond in complicated ways to the ups and downs of any journey. Leaders are there when needed to help them move constructively through these responses.

Leaders of any era have always had to buoy spirits, explain difficulties, celebrate gains and capture imaginations. You can be an a-leader, b-leader, c, d or e-leader, but you'd better be a leader of people first, cooking up alphabet soup last.

What's Changed by Degrees

It's true that much has changed over the years, but many oft-cited discontinuities are simply shifts by degree. For example:

- Speed matters more as the rate of change continues to increase. Product development, executive decisions, company life cycles and technology penetration are all happening faster than ever. Massive deals are completed in weeks or days rather than months. Leaders today must be more decisive and more comfortable with rapid, iterative modes of action.

- More complexity is needed to make things simple. The level of technical sophistication embedded in most businesses has increased significantly. But complexity doesn't sell, simplicity does. Leaders today must be more technically savvy and more adept at leading technical workforces with higher levels of specialized knowledge than ever before.

- Greater diversity makes unity harder to achieve. The generational impact of younger employees on businesses is larger than ever before. There is also more cultural diversity in the workplace. Leaders today must be prepared to identify and attract young, adept, culturally diverse employees.

- Global scale, integration and competition redefines what it means to be local. There have been global businesses in the past, but never so much potential for almost any business to go global. And once they do, there are larger competitors to contend with. The challenges of rapidly integrating networks, economies and societies are creating unique sets of problems and opportunities that today's leaders must be able to handle.

In sum, the combination of speed, complexity, youth and global integration has created underlying conditions for business that require a new *intensity*, rather than a new type, of leadership.

What's Changing Fundamentally

The four truly fundamental changes that are taking place today have to do with digital information processing, our knowledge of life (i.e., genetics and medicine), materials science (e.g., nanotechnology) and the capabilities of the mind. These are my picks, but yours might be different. The point is, any leader ought to have one corner of his or her mind open to thinking through such larger trends and their implications both today and down the road.

At least once every quarter, I hold informal sessions with my best thinkers in which we dream, project and plan what's coming down the pike over the long term and what it means for us today. The practical benefits come in everything from patent applications and new product ideas to better radar for strategic partners and a sense of confidence in our overall corporate direction. To predict the future, I'm convinced you have to look for it, envision it, plan for it and invent it.

In short, true leadership means applying the best of what has always worked along with new elements that are needed as environmental conditions evolve. It is too rich a concept in too complicated a world to be enhanced by a single letter.

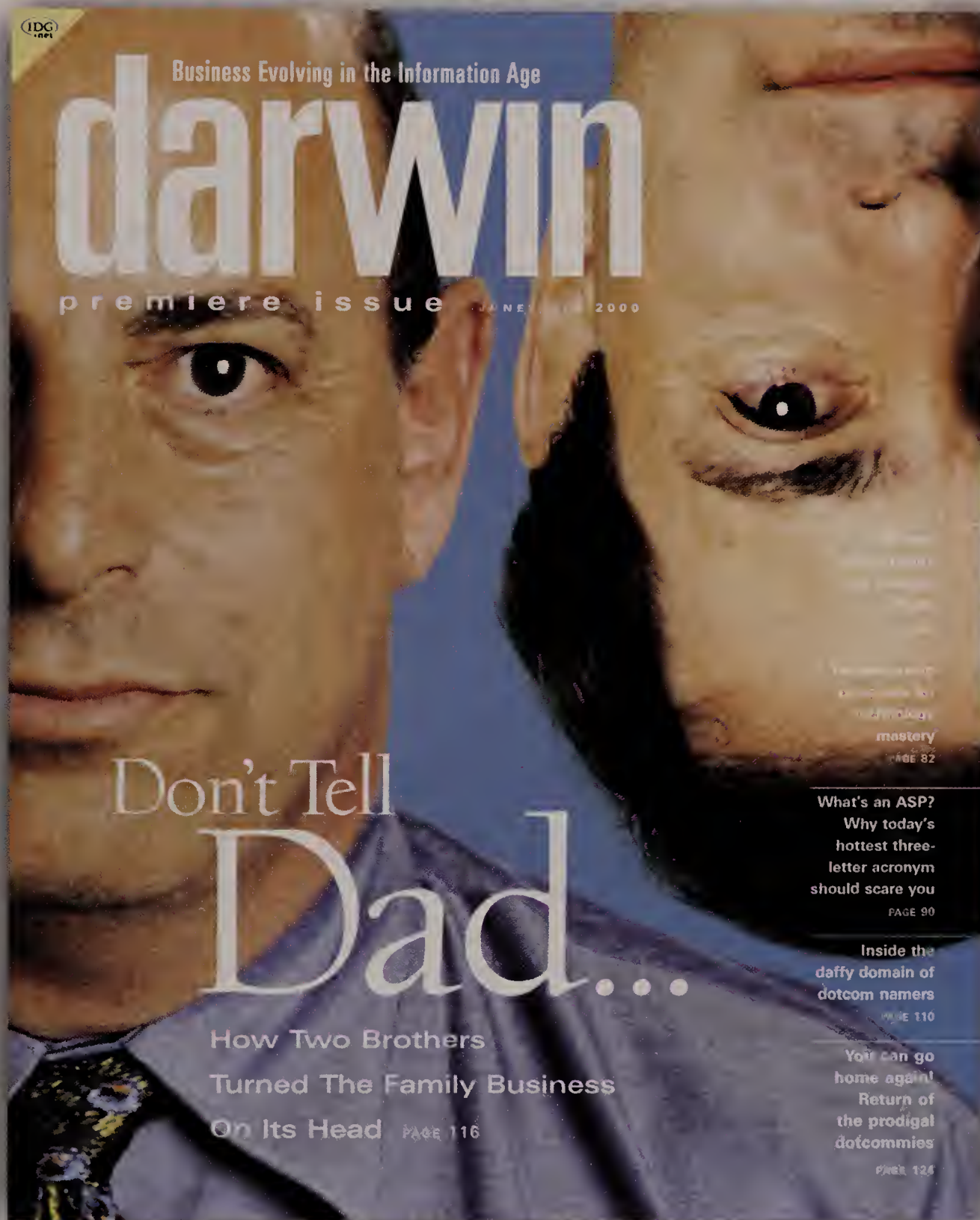
My advice is, forget about the notion of an "e-leader" and think for yourself. Think hard about your company, your environment, what's changing and what's not and, most of all, about how great a journey you want to take, where you're going to go and how you're going to get there. Your adventure is likely to be a compelling one, and there are bound to be others who want to go there with you. **CIO**

Do you think we need e-leadership? Let us know your thoughts at leadership@cio.com. Christopher Hoenig has been an entrepreneur, government executive (director for information management and technology issues at the GAO), consultant (McKinsey & Co.) and inventor, and he wrote a forthcoming book on problem solving and leadership techniques. He is now chairman and CEO of Exolve in Washington, D.C., focusing on next-generation Web-based problem solving.



PHOTO BY KATHERINE LAMBERT

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Career Counsel

Mark Polansky Offers Advice to Aspiring CIOs and IT Managers

Two-Faced?

Q: I am currently director of systems engineering in a large company. I have a great job, a good boss and mentor, and I love the work. But a wealth of opportunities in the Greater Boston area, coupled with some concerns about the health of my corporation, lead me to wonder if I should be more active in getting my résumé out to executive recruiters.

In my leadership role, I feel obligated to deliver upbeat, positive messages to the engineers, telling them why they should stay at this company, both to retain them and to ensure that my concerns don't become reality. How do I initiate a job search and not appear and feel two-faced in the process? If I do eventually take a new job, how do I face those who trusted me enough to stay?

A: You are one of the relatively few lucky souls who have a great job, a good boss and mentor, and who love their work. The fact that you are thinking about the available wealth of opportunities tells me that something else is bothering you, whether it's compensation, ambition or just wanderlust.

If it is an issue that your current employer might be able to



address, like compensation, try to resolve it directly with your boss before making a decision to move on. But if what's distracting you can't be resolved then discreetly put your résumé and your feelers out in the market.

The second part of your question seems better suited for an ethicist rather than a career counseling column writer, but let's take a shot at it. Yes, you are indeed responsible for sending positive motivational messages to your staff, which means presenting the truth in its best light, with an optimistic spin, but without being untruthful or misleading. If your coworkers have concerns about the company's future, get them out in the open and immediately follow that with what management is doing to turn things around. You might even convince yourself to hang around in the process. But if and when the time comes to move on, your honesty and directness in dealing with the issues should leave you with a clear conscience.



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FIGHT OR FLIGHT?

Q: I have two questions. First, I'm 32, and I have a CIS degree and an MBA. I'm already a vice president for a \$500 million-plus asset bank, and I have about 10 years' full-time experience, five in IT management. Does my age hurt me for consideration for CIO positions?

Second, as vice president of IT, I don't necessarily agree with my CIO's approach to projects, which seems to suggest he will do what's necessary to satisfy the directors—but no more. Our Internet strategy was developed in a day. I want to implement more. I have what I think are good ideas, and I fear we're missing some opportunities. Should I stay put and get more aggressive or look elsewhere?

If you are determined to become a CIO, you must shed your current management responsibilities and get yourself back in a full-time IT role.

A: Anytime there is a difference of philosophy or opinion between you and your immediate supervisor, at any level—whether between vice president and CIO or programmer and project leader—there is only one good approach to reaching a positive resolution. Set up an opportunity for you and your superior to sit down and logically and calmly explore the issues at hand. This means asking questions that usually start with why rather than making position statements that might be hard to reconcile or adapt. You may find the answers to your questions very enlightening, and the reasoning and realities behind them may help you understand your superior's course of action. Or you may find that you and your boss are just out of sync in some important ways. In that case, make sure that you are not the one who is being shortsighted or narrow-minded. If you are certain of yourself and your views, and if your boss is well regarded by management, then perhaps you are in the wrong environment.

And as I have said many times in this column, experience and capabilities are far more significant than age in determining if you're qualified to run your own shop. Simply be practical and remember that water always seeks its own level.

CIO TRANSFER

Q: I have been at a large health-care company for the past 10 years, the last six of which I've held the IS director position. I've taken on a variety of responsibilities including application development, e-commerce and operations for telecom, networking and desktop computing. I've moved within the corpo-

rate venue and the smaller market/business unit sites to get a complete feel for both this position and this company. Now I'm looking to move on to other challenges. I'm very interested in applying my management and IT skills in another industry. What are your thoughts about seeking an equivalent director position, or a vice president/CIO role, in an industry outside of health care?

A: There are some very obvious pros and cons to switching industries midcareer. The primary consideration is the trade-off between staying in health care and bringing maximum experiential value to the market and to your next employer along with the commensurate financial reward to you, versus

taking on the challenge of, and learning, a new industry and being rewarded with a broadened perspective of the business world and added versatility to your background.

If the latter scenario appeals to you more than the straight-and-narrow path of one industry, then you should surely go for it! The only way to find out how difficult the change will be, and whether or not you will like your

new industry choice is, of course, to try. As always, follow all the best advice regarding crafting a great résumé and a smart outreach program, plus interviewing excellence—always placing an emphasis on your transferable skills and experience, both technical and leadership oriented, while not emphasizing the particularities of health care.

GROWTH SPURT

Q: I have worked for a training company for nearly eight years, starting out as an instructor and consistently moving up in the company. I was our company's first network administrator, and seven years ago I was asked to start our technical training division.

As a result of the company's success, I have been promoted to 11 different roles in the past eight years, including program manager, sales manager and IS manager consecutively. However, most of my time has not been directly involved with internal IS issues but rather with client-focused activities.

Recently, I was promoted to a national position, where I have the opportunity to direct our strategy. However, since our company is based in another state, I feel my career growth is limited. I want to be on a career path to become a CIO. What is my best option? Should I go to a company with tuition reimbursement and get an MBA? Should I look for a more management-related role?

A: You have built a great promotional track record, and now you have an opportunity to drive your company's business

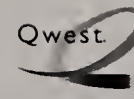
Here — at the first ASPCON — we're all obviously energized for what the future holds for the ASP, and I'm sure we share the same conviction: we're sure that the market reaches its full potential. For those of you who don't know Qwest Cyber Solutions, or QCS, as we call ourselves, we are actually the largest privately held enterprise ASP out there today. So, what are the challenges and opportunities we must address? **The ASP business is a hot topic**, right? Few have such tremendous promise... expected to bring in as much as \$22 billion by next year! Yet it still lacks definition. Now's the time for the industry to stand and be counted. Because our customers are counting on us. We must ask what exactly is an ASP? What can we deliver? Finally deliver? How do we define ourselves? Not just for today, but for the future? Today, I want to discuss three important points that will set the stage for success in this market no matter what side you are on. The stakes of the game. The definition of the space and the business models that are likely to succeed. What the future holds. When you talk about point number one...the stakes of the game...you go directly to customer opportunity. With all parts of life seemingly locked on fast-forward...we even have a whole new measure of time...internet time. The Internet has changed the rules of the game for all businesses—creating a whole new set of challenges and measure of success. Enter the ASP, the remedy for what ails the enterprise. The ASP frees companies from building and maintaining technological infrastructure...installing and managing software...finding and keeping scarce technological talent...and all the other time-consuming steps to creating business transformation. **It takes clear goals**...careful planning...high standards of performance and reliability...and a seamless partnership between supplier and user. Which takes us right to critical issue number two...defining the space. Here's the way we at QCS see it: Businesses count on certain mission-critical applications to survive. Payroll has to be paid. Raw materials have to be on the dock at the right time. Customers have to be identified, tracked and serviced. These things are imperative. So here's the promise of an ASP: to offer the **expertise and resources that allow customers to focus** their own resources on core competencies rather than the upkeep and maintenance of an internal hosting technology infrastructure. To add value, the ASP must deliver absolutely reliable service for the mission-critical applications. It must fit seamlessly into an organization. Every solution should aim to be a turnkey answer to its challenge. This is a concept that QCS is referring to as **"plug and play"** for the digital enterprise. The enterprise is in need of technology that runs so seamlessly that it is in essence a utility. To achieve this seamless utility, it is also important to recognize that different customers require different solutions. We see demand for three main types of ASP products. And this is how we define the ASP space. First, there is demand for **a complete packaged solution** coming often from start-up types of organizations that essentially need everything. Here, the customer rents the software...services are subscription based...and the provider manages applications and infrastructure. These companies need fast activation, reliable service and experts to keep them running. Today, this segment represents a pretty small piece of the total market opportunity. But it is also growing the fastest. Second, there is also demand for **hosting of business-critical applications**. Many ASPs today are not viewing the large installed base of companies out there as potential customers. But the fact is that just because they already own the license to a particular ERP or CRM application, these companies still want to gain the resources and efficiencies associated with a monthly rental model for application-hosting and management services. And the third area, which actually accounts for the largest segment of the market today but is rarely discussed in the ASP arena, consists of those companies that need **support in managing applications** that they already own and operate in-house on their existing infrastructure. They want help in running it all...they want help in maximizing the impact on the business...they want help in dealing with the complexity. This is, conservatively, a \$15 billion opportunity out there in companies who really need applications management but may not be immediately ready to move to the hosted environment. And, when the time comes to make choices about their internal infrastructure, they will be making important decisions about moving to a hosted model. As an ASP that has been there earning the confidence and trust through excellent management of their applications, you are likely to find yourself with an expanded customer relationship. We believe an ASP has to have the flexibility to meet all these needs...from daily management help to building and running the whole thing. But no matter how and when you engage in the business...one thing is a must. The service has to be **simple to access and simple to manage**...again, the plug-and-play capability that lets the customer concentrate on the business at hand. The successful ASP model of the future will package delivery, software and management to provide value and intersect with need at the real pulse points of the organization. Delivery of the often-repeated promise of one-stop shopping. The next question...and it's always the most important and interesting one on the table...is where do we go from here? What will shape the market? Reliable execution and service level will set apart the strong players very soon. Proving that ASP is ready for prime time is about execution, reliability and instilling trust. The bottom line is that we're here to provide the **first-time-right infrastructure**. We need to be ready to plug in and go. If we step back for a minute and think about business drivers, we need to look no further than that management prime directive: **First things first, second things not at all**. We ASPs need to respect the customer's need to concentrate and focus, specifically on those critical core competencies that are the ultimate source of any company's competitive advantage. We ASPs need to provide support for it so that the customer can tackle core business challenges. We need to be rock-solid reliable, fast and running seamlessly and invisibly. To do this we must commit to continuous improvement for our customers. We have to invest in our infrastructure and provide the confidence that our systems will not fail the customer. ASPs have to invest: build the tools and develop the new types of technology solutions that keep ASP solutions humming. By delivering first-time-right, bulletproofed solutions, customers will realize the true value that an ASP has to offer. And, what's next? Sector-oriented ASP solutions. QCS has identified a few key markets around which we will focus on building the first sector solutions: finance, communications, healthcare and services. For each of those sectors, we are leveraging our infrastructure, industry experience and rapid activation templates and existing suite of products to build new sector-specific products that really add value for their needs. We will apply best practices to those sectors, blending them with industry-centric technology that makes sense. Building solutions that are tailored toward certain industry sectors is a step forward in providing the right fit. And a better fit means huge gains in speed to engagement, cost efficiency and more value. To wrap up, we see the industry evolving in the future where enterprise ASPs offer solutions catering to industry sectors. This is not the endgame, merely the beginning of something bigger. But, before I get too carried away, let's remember that this is still a young industry with a long way to go. Focusing on the relationship between the ASP and the customers — and really answering their needs — will make the difference. We are committed to raising the bar to deliver the essential technology life-support systems required for the 21st century digital enterprise. **And we are prepared to deliver on the promise now!** For any customers out there considering ASPs, I would advise you to ask some important questions before making your decision. Ask those questions that will reveal the true strength of the organization. Find out about the depth and breadth of the company and what it can offer. Find out if they can deliver what they promise. Get a real sense as to whether this company can "plug and play" with the right solutions for your business. I will leave you all with this to think about. We all want to build a better business for the 21st century. The right ASP can help you get there. It is simply a matter of reliability, results, strength and vision. Thank you.

John Charters, CEO of QCS

Is Your ASP Plug 'n' Play Ready?

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Career Counsel

strategy. If you are ready to walk away from all that, then you must really not be fulfilled in your current career path, despite the rapidly increasing importance of technical training and lots of new and compelling issues to address like instructional technology and distance education. And in this day and age of connectivity and virtual organizations, the geographic separation should not deter you from your company's offer.

But if you are truly determined to become a CIO, then you must shed your current training management responsibilities and get yourself back into a full-time IT role. Try doing this at your present employer first—always the best choice since

Have a career question?

Visit our website at www.cio.com/forums/executive/counselor.html and pose your own questions to Mark Polansky.

they already know you and your success profile—or elsewhere if necessary. Assess your IT technical and leadership skills and experience to determine the appropriate level for you now and whether a step down the ladder—the CIO career path ladder—might not be a good restart point. And getting your MBA would be a good idea with either course of action.

LOOKING FOR E-EXPERIENCE

Q: How can I make the move to a CIO or senior IT position at a smaller organization, such as a dotcom or an e-commerce division of a larger company, after spending the bulk of my career as an independent consultant?

I have an MBA degree and 10 years' experience. Functionally speaking, my experience is in the areas of data warehousing, customer relationship management (CRM) and e-commerce.

I have grown from being a hands-on senior business analyst and developer to my current role in project leadership. My past clients are easily and readily recognizable household names, and I am currently with the premier full-service online bank implementing a CRM and data warehouse strategy.

A: I wish that all the requests for career counsel and advice I receive were as positive as yours. While your many years of consulting and hands-on project leadership experience have not fully prepared you for the business-driven strategic and corporate political demands of a significant CIO position, you have indeed put together the type of background and experience highly sought after today for the role of chief technology officer in the e-business world. Whether you pursue a startup,

an early stage dotcom, or the new media or e-commerce unit of a traditional enterprise, the trade-off between the two (small and new versus bigger and more established) will follow risk and reward inversely, and the choice is yours to make according to your affinity toward risk. Craft your résumé to highlight those areas of relevant e-xperience and e-xpertise you mentioned in your letter, and get it out to a select few highly reputed and well-known search consultants—and include me if you will!

THE PATH TO CIO

Q: I have a bachelor's in computer science. I am in my mid-20s and have about three years of hands-on programming experience as well as three years' experience as an IT operations manager in a small company specializing in B2C e-commerce and smart cards. My responsibilities include managing the company's infrastructure, research and development, and support.

I am looking toward becoming a CIO in an e-commerce-related company, as I'm also just about to start pursuing a master's in business systems. Though it's more technical than an MBA, it's still focused on business rather than coding. Should I start this program, or should I pursue a traditional MBA or a standard master's? Also, when I do graduate, should I look for a management position or a programming job?

A: The fact that you have thus far chosen to pursue a master's in business systems, coupled with your objective of becoming a CIO, tells me that you want to be involved in strategic business issues as well as technology. Additionally, your desire to become a chief information officer in an e-commerce enterprise will tie you to technology as a primary element of your intended employer's business model. And so I think your master's in business systems is probably a very good choice.

As for your career path, six years of experience, even in today's rapidly moving pace of e-business and dotcoms, is still a bit early for a significant CIO role. Be patient, solidify your technical skills and grow your business-oriented and management abilities by looking for a position with both technical and leadership content, and build a great foundation for your future. **CIO**

Mark Polansky is a managing director and member of the advanced technology practice of Korn/Ferry International in New York City. He is also the chairman of the Greater New York Chapter of the Society for Information Management. The Web-based Executive Career Counselor column is edited by Web Research Editor Kathleen Kotwica. She can be reached at kkotwica@cio.com.



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ERP, One Letter at a Time

Transforming your enterprise and supply chain? Better get the business case down, goal markers set up and everyone on board to make it happen.

BY BILL JEFFERY AND JIM MORRISON

IN SEPTEMBER 1998, when Juan Sanchez took over as CIO of Delphi Automotive Systems Europe in Villepinte, France (north of Paris), the company was in the midst of an enterprise resource planning (ERP) project with straightforward targets and a dizzying array of challenges. As the project got under way, the stakes for a successful implementation increased. At the end of the day, Sanchez and his team learned that such a project took a lot more than careful planning. It took vigilant monitoring of detailed goals, the committed involvement of executives and workers alike, a focus on customer needs and the careful building of a business case for the endeavor.

At the time, Delphi was organized on a geographic basis with different systems in each European country. Where divisions crossed geographic borders, systems support was not consistent. A major implementation of ERP software, with a planned expenditure of more than \$50 million, had begun more than three years previously at what was then a European subsidiary of General Motors. The project's ambitious goal: to replace dozens of aging—and incompatible—manufacturing and distribution legacy systems scattered throughout



the 58 Delphi sites in eight European countries with a single enterprisewide system.

It wasn't simply the technical aspects of the ERP implementation that made the work difficult. It was the complex business scenario at Delphi that made the new system an imperative and heightened the risk of failure. Possible complications included:

■ **Systems across borders.** The new ERP system needed to cross multiple geographic, cultural and linguistic boundaries. More than 3,500 employees would depend on it to get their daily jobs done. Each country had developed business practices independently, and some could not be reconciled because of the varying legal and regulatory requirements—despite the efforts of the European Union to resolve some of the cross-border inconsistencies.



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Expert Advice

■ **Date-rollovers.** Delphi was using the project to help solve its Y2K compliance issues. The project also had to help the company support the new euro currency; managers wanted it to provide Delphi's various country locations a single conversion from one system, rather than one conversion for each different system.

■ **Changes at the corporate level.** The June 1999 spinoff of Delphi Europe from General Motors occurred in the middle of the project.

■ **A lack of in-house IT staff.** Delphi itself had no IT staff or systems independent of its soon-to-be-ex-parent, General Motors. Its in-house IT expertise was minimal.

More than two years into the project (at the end of 1997) Delphi engaged our company, A.T. Kearney, to ensure on-time, on-budget completion of the project and a tangible ROI, while EDS Corp. took responsibility for the technical aspects of the rollout of the new SAP R/3 system.

Mindful of Mistakes

A.T. Kearney viewed this as an opportunity to drive the implementation from a financial and operational perspective, something we felt other companies implementing ERP projects had not done.

You don't have to go far to bump into lots of evidence that shows how ERP software has not delivered on the promises

You don't have to go far to bump into lots of evidence that shows how ERP software has not delivered on the promises of vendors.

of vendors. Some recent cases where ERP has had publicly disastrous results include Whirlpool, where an ERP implementation crippled the shipping system, leaving appliances stacked on loading docks—and therefore not delivered to paying customers—for a full eight weeks in 1999. Hershey Foods (also in 1999) claimed that a 19 percent drop in earnings was caused by an incompetent ERP implementation that wreaked distribution havoc during one of its most profitable seasons: Halloween. And according to *Computerworld* (Jan. 3, 2000), a new ERP system at Volkswagen resulted in significant delays in parts shipments, causing product inventories to build up to costly levels. While these high-profile failures were not top-of-mind when Delphi made its decision to implement ERP, they later served as reminders that such projects can easily get out of control.

Attempting a large-scale ERP project (including implemen-

tation and operations) is an expensive proposition for any organization. A recent Meta Group report measuring the net present value of ERP implementation projects found that approximately 60 percent of respondents indicated a negative return on investment. That number climbed as high as 80 percent depending on the specific software implemented. And because many of these first-generation implementations were internally focused with no associated business case (for example, emphasizing cost reductions, technology and process improvements rather than external benefits like extending ERP systems to players in the supply chain) quantifiable benefits were virtually nonexistent.

A Highly Structured Implementation

The process we employed on Delphi's behalf focused on six major initiatives:

■ **Developing a quantifiable business case.** Delphi executives first established concrete goals for the business processes they wanted to improve, such as increasing service levels, and calculated the expected benefits to be realized from these improvements.

■ **Defining best practices.** Functional teams defined best practices, such as standardizing accounting procedures across Europe and standardizing logistics processes. These teams, composed of key Delphi executives from affected areas (in this case, logistics and finance), included representatives from a broad range of nationalities and cultures. These executives identified "key migration points" and the precise type and timing of a change.

■ **Planning prior to implementation.** Planning for actual rollout of the new system at each site began very early in the project cycle. An implementation readiness assessment was used to determine if the necessary IT infrastructure was in place and to make sure each site was capable of handling the transition to the new ERP system.

■ **Strict monitoring of implementation schedules and costs.** Once the actual rollout began, a strict, deliverable plan was imposed on each local site. All milestones were carefully tracked, measured and rechecked to ensure that scheduled changes were made on time and on budget.

■ **Cross-cultural training.** To make sure that all affected people (targeted users of the new system as well as consultants and managers) were on the same page in terms of goals and priorities, a project "university" was established in a central location (Paris) to provide training to everyone involved in the project.

■ **Rigorous tracking of deliverables.** Identifying and then relentlessly tracking the complex web of incremental milestones



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Expert Advice

was critical to the success of the project. The methods used were grounded in A.T. Kearney's deliverables philosophy and capitalized on A.T. Kearney's strength and experience in managing large-scale programs.

Lessons Learned

After Delphi executives established their goals and expected benefits when the program was initiated, A.T. Kearney used its benefit assessment framework, Implementation Value Capture, to strictly monitor all deliverables and identify additional revenue-generating or cost-cutting opportunities that Delphi could achieve as a result of implementing the new system.

The highly structured implementation plan put into motion by Delphi and A.T. Kearney set the stage for success. Among some of the valuable lessons learned along the way:

- **Define the business value you hope to receive**, such as reduction in lead times, in concrete and easily measurable terms.

Diamonds in the Rough

In retrospect, the most interesting part of this experience was that many of the reasons the project is so valuable couldn't have been articulated at the time the project was jump-started. You could even go so far as to say that Delphi would not be a viable company today if it had not begun putting in the ERP system. Examples of the project's value to Delphi include:

- **The ability to serve many customers.** The ability to serve multiple competing customers in an open market, each having unique EDI procedures, forecast requirements, master schedules and shipping needs. To do that with the old system would have been very difficult and costly, if not impossible.

- **Plants working in sync.** The ability of 58 sites to work in tandem to fill complex orders that spanned multiple customer sites throughout multiple countries. For example, plants in Delphi's U.K. operation are now able to share resources with plants in Portugal, which was previously difficult and cumbersome.

- **A workforce that is technologically up-to-speed.** Previously, many of the employees had never touched a PC. "The technical education alone was worth it. We pushed the latest technology throughout the entire company," according to Juan Sanchez, Delphi's CIO.

—B. Jeffery and J. Morrison

- **Set up regular review measures** to make sure you are achieving your goals.

- **Don't underestimate the art of "change management."** Establishing a training hub (such as Delphi's "university" in Paris) helps ensure that all participants in the project—no matter where they are or what language they speak—understand the goals of the project.

- **Make sure that every vendor involved in the project has "skin in the game"**—sharing in the risks of the venture. In the case of Delphi, both consulting partners—A.T. Kearney and EDS—agreed to share in the risk that the project might not succeed by adhering to a fixed time frame at a fixed price. Any cost or time overruns were the responsibility of the consulting partners, not Delphi. A.T. Kearney had to excel at planning the program, managing risk and delivering results.

- **Don't lose sight of the impact on the customer.** During any major transformation of a company's core business processes, all changes must be absolutely transparent to customers. In Delphi's case, with a technically sophisticated clientele such as BMW, Ford, GM, Mercedes and Volkswagen, the slightest hiccup in manufacturing plans could have an enormous financial impact on a customer's business. Notes Sanchez, "We not only had to make many more changes than we originally planned but also had to change how we had originally planned them."

Thinking Ahead

Conventional wisdom says that business is changing so fast that a single Internet year is worth four calendar years; this means that the formerly standard five-year corporate strategic plan needs to take into account the equivalent of 20 years of radical change in a given industry. It's the challenge that many companies face these days. Although the business case for Delphi's ERP project was originally completed in 1996, Delphi's earlier decision to implement SAP clearly helped the company achieve specific strategic objectives, such as establishing common systems and standardized internal processes, creating fast and accurate information flows across the supply chain that are customer driven and supplier supported, enabling the swift integration of any acquisitions, improving productivity of the finance function and working capital utilization, and reducing the cost of legacy systems by more than 30 percent.

About the decisions made so long ago, in a different business climate, Sanchez agrees it was the right thing to do at the right time. "The team made a number of very wise decisions early on in the process. We are a completely different company now," he says. **CIO**

Bill Jeffery and Jim Morrison are vice president and principal, respectively, with global management consultancy A.T. Kearney.

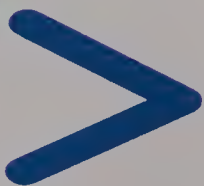
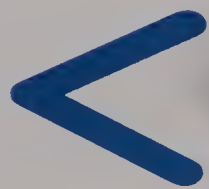


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WHY WOMEN HATE IT.

BY CHERYL BENTSEN

Almost half of all IT job openings will go begging this year. At the same time, women are leaving the IT ranks at twice the rate of men. Something is very, very wrong here. Is it just the man-woman thing?

The Boca Raton Resort & Club looms over Florida's Gold Coast like some swank pink phantasm of the Jazz Age. A gaudy, sherbet confection of Spanish-Mediterranean, Moorish and Gothic excess, with hidden gardens, barrel-tile roofs, archways, ornate columns and critter-studded fountains—the ladies' rooms alone could pass for posh digs on Manhattan's Upper East Side.

The resort, spread over 356 acres, offers a confounding choice of pleasures: 34 tennis courts, two championship golf courses, five pools, a marina, the usual salons attendant to health and beauty and, of course, a half-mile of perfect, private beach. And there are smaller enjoyments as well—white-jacketed, multilingual waiters hefting perspiring silver trays of freshly squeezed lime coolers.

It's a small wonder in this setting—where recent guests have included former President George Bush, Robert Redford, John

Travolta, Oprah Winfrey and Elton John—that the attendees at last May's Giga Information Group's GigaWorld IT Forum 2000 would stand out, a bit like William Golding's plane-wrecked schoolboys in *Lord of the Flies*. At the opening session—a rousing call to action on globalization for e-business (I smell IT spirit!)—the optimism among the thousand or so mid- and senior-level IT managers brought together to talk infrastructure and application development, CRM and wireless protocols is palpable. But what's wrong with this picture? I glance around the grand ballroom and realize that I am one of the few women in a veritable sea of white males.

It reminds me of my stint as a sportswriter for the *Los Angeles Times*, where my buddies, the baseball writers, were all guys, and the Dodger organization sent me a tie for Christmas. Sports guys, IT guys. It's a similar kind of vibe. The Boys of IT. Carl Jung, Sigmund Freud's not-so-friendly student, colleague and adversary, used the term *puer aeternus* (eternal boy) to describe the archetypal boy (women: think Peter Pan, problematic boyfriends and ex-husbands) whose traits include spontaneity and restlessness, proclivity to tinker, prankishness, ties to mom and awkwardness around girls. Thanks to IT, *puer aeternus* now commands a big salary and stock options, and is the most coveted, heavily recruited category of professionals on the face of the earth. His counterpart, *puella aeterna*, the eternal girl, might as well be home baking cookies.

James Brown sang it so long ago: It's a man's, man's, *man's* world! Can it still be so? In IT, absolutely.



"THERE WAS A BUBBLE OF WOMEN WHO WENT INTO COMPUTER SCIENCE IN THE MID-1980S, AND WE HAVE NO HARD DATA ON WHERE THEY'VE GONE. —Anita Borg, founder and president of the Institute for Women and Technology.



— *in e-business* —

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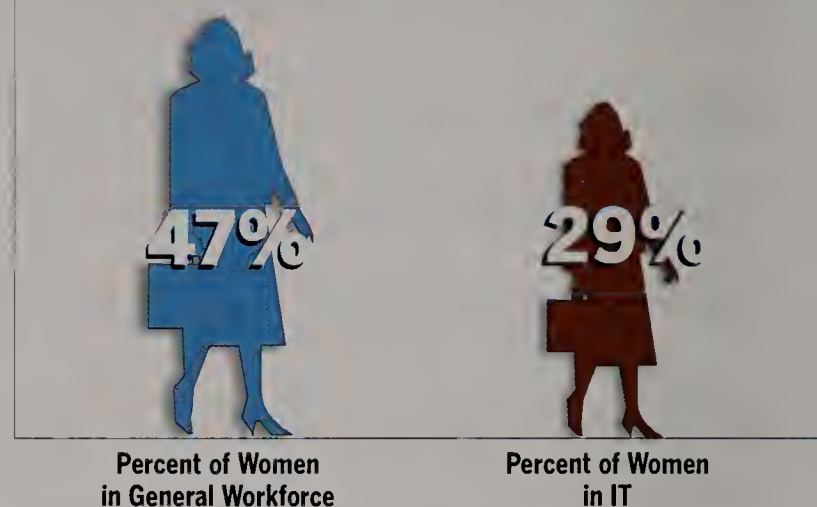
The facts are beyond dispute. A study, "Opportunities and Gender Pay Equity in New Economy Occupations," issued by the White House Council of Economic Advisers last May noted that women make up only 29 percent of workers in IT occupations, compared with 47 percent in the general workforce. And despite high-profile exceptions like Carly Fiorina, Hewlett-Packard's CEO in Palo Alto, Calif., women are virtually absent from the ranks of senior IT management.

Midway through the Giga conference, at the de rigueur beach party, the true dimensions of the gender gap are made plain. What kind of party is this, with some 900 men and (maybe) 50 women? The band plays "Louie Louie," a couple of buff vendors prance with a handful of game women, hundreds of guys huddle in small, quiet packs, sucking on bottles of beer. More than a few of the women make early exits. The band's rendition of "La Vida Loca" inspires a handsome, young, socially adept Argentinean, an e-biz entrepreneur, to dance with two and three women at a time. I stake out a partner in a Hawaiian shirt and floppy hat near the edge of the dance floor. He's willing but says, "It's been a long time—can you lead?" Several hundred other men hold their ground. The gender disproportion is truly weird.

The causes of the disparity are rooted in that age-old conundrum of what is men's work and what is women's work.

In a two-year study released last April, "Tech-Savvy: Educating Girls in the New Computer Age," the American Association of University Women (AAUW) in Washington, D.C., looked hard at female attitudes. The findings suggest one ineluctable fact: The vast majority of girls and women hate IT.

THE INCREDIBLE SHRINKING WOMAN I



According to Sherry Turkle, professor of sociology at MIT and cochair of the AAUW study commission, girls are not computer-phobic, they are "computer-reticent," asserting a "we can, but [we] don't want to" attitude toward technology. When asked, they most often express the view that computing involves work that is "tedious, sedentary and—most critically—antisocial." The report notes that "girls often position themselves as morally or socially more evolved than boys who, they tell us, enjoy 'taking things apart' and interacting with 'machines.'" Girls expressed the view that IT-related careers are a "waste of intelligence," that they want careers where they can "make a difference," while boys just "want to make money." Significantly, the report says girls are often ignorant about IT career options and are "only vaguely aware of the social, interactive and creative applications of computers."

The AAUW notes: "There is no question that there is defensiveness in the way girls denigrate these activities."

A WOMAN'S PLACE

Want to know what women want? Try asking them. Now *there's* a radical idea.

THE IBM EXECUTIVE WOMEN'S DIVERSITY Task Force, formed in 1995, began by asking executive-level women for their thoughts regarding barriers to their advancement at IBM. The result was recommendations for follow-up focuses, including Women of Color, Women Executives and Women in Technology. In support of the initiative, IBM's managers are required to attend diversity training courses, conduct departmental diversity meetings and promote attendance at diversity town hall gatherings. Managers are accountable to CEO Louis V. Gerstner for meeting diversity goals. Ted Childs, vice president of Global

Work Force Diversity, reports progress directly to the board of directors. Performance evaluations for executives and managers include diversity efforts.

Women now represent over 30 percent of IBM employees nationwide and one-quarter of its managers. Women in executive positions in the United States have increased from less than 2 percent in 1980 to 20.8 percent at the end of 1999. Globally, women make up almost 18 percent of the worldwide IBM executive population, up from 11.5 percent at the end of 1995.

The Women in Technology steering commit-

tee, headed by Linda Scherr, a computer scientist for 27 years, focuses on three goals: The support and advancement of in-house female tech talent, the active recruitment of college women and programs to encourage girls to pursue technical careers. Last summer, IBM sponsored five onsite technical camps for middle-school girls, facilitated by the company's female engineers. Says Scherr, "The idea is to let the girls actually do engineering, see what engineers do and see the difference that engineering makes in society. Women are very practical, and they want to know the societal impact of what they do." —C. Bentsen

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WHERE HAVE ALL THE WOMEN GONE?

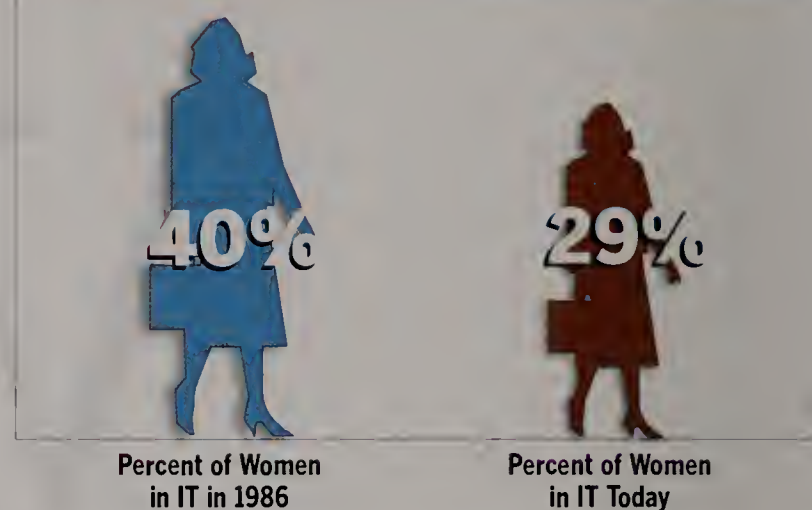
What we have here is what used to be called a failure to communicate, an IT scenario of *Men Are from Mars, Women Are from Venus*.

According to the White House study, women in IT earn on average about 60 percent more than women in other occupations. The opportunities are there. Yet the same study reports that female IT share in the workforce has actually fallen from a peak of 40 percent in 1986 to today's 29 percent.

This last point mystifies Anita Borg, founder and president of the Institute for Women and Technology and a member of the research staff at Xerox's Palo Alto Research Center. Borg earned a doctorate in computer science from the Courant Institute at New York University in 1981 and worked for Digital Equipment Corp.'s Western Research Laboratory in Palo Alto before coming to Xerox. At Digital, she developed tools for predicting the performance of microprocessor memory systems. The leading voice for the advancement of women in science and technology, she cofounded the Grace Hopper Celebration of Women in Computing, a biennial conference for women computer scientists that will meet Sept. 14-16 in Hyannis, on Cape Cod, in Massachusetts.

"Just because everybody is saying that the number of women going into the field has gone down, we shouldn't forget that there was a bubble of women who went into computer science in the mid-1980s, and those women today would

THE INCREDIBLE SHRINKING WOMAN II



have 15 years of experience," says Borg.

"I was part of that bubble," she continues. "I feel as if there are a lot of women my age around—but the numbers suggest that many more have disappeared, and we have no hard data on where they've gone."

The declining number of women in IT (the White House study says they're leaving at twice the rate of men) is even more remarkable given that we are in the longest economic expansion in American history and the labor shortage for skilled IT workers is famously acute. The Information Technology Association of America in Arlington, Va., expects that half of the 1.6 million IT job openings expected this year will likely go begging.

"IN COMPUTER SCIENCE, WHAT'S OBVIOUS IS THAT THESE PEOPLE WORK LONG HOURS. THE ROLE MODEL IS DILBERT, CUBICLES, DUMB, GEEKY-LOOKING PEOPLE." —Linda Scherr, program director of IBM Women in Technology.

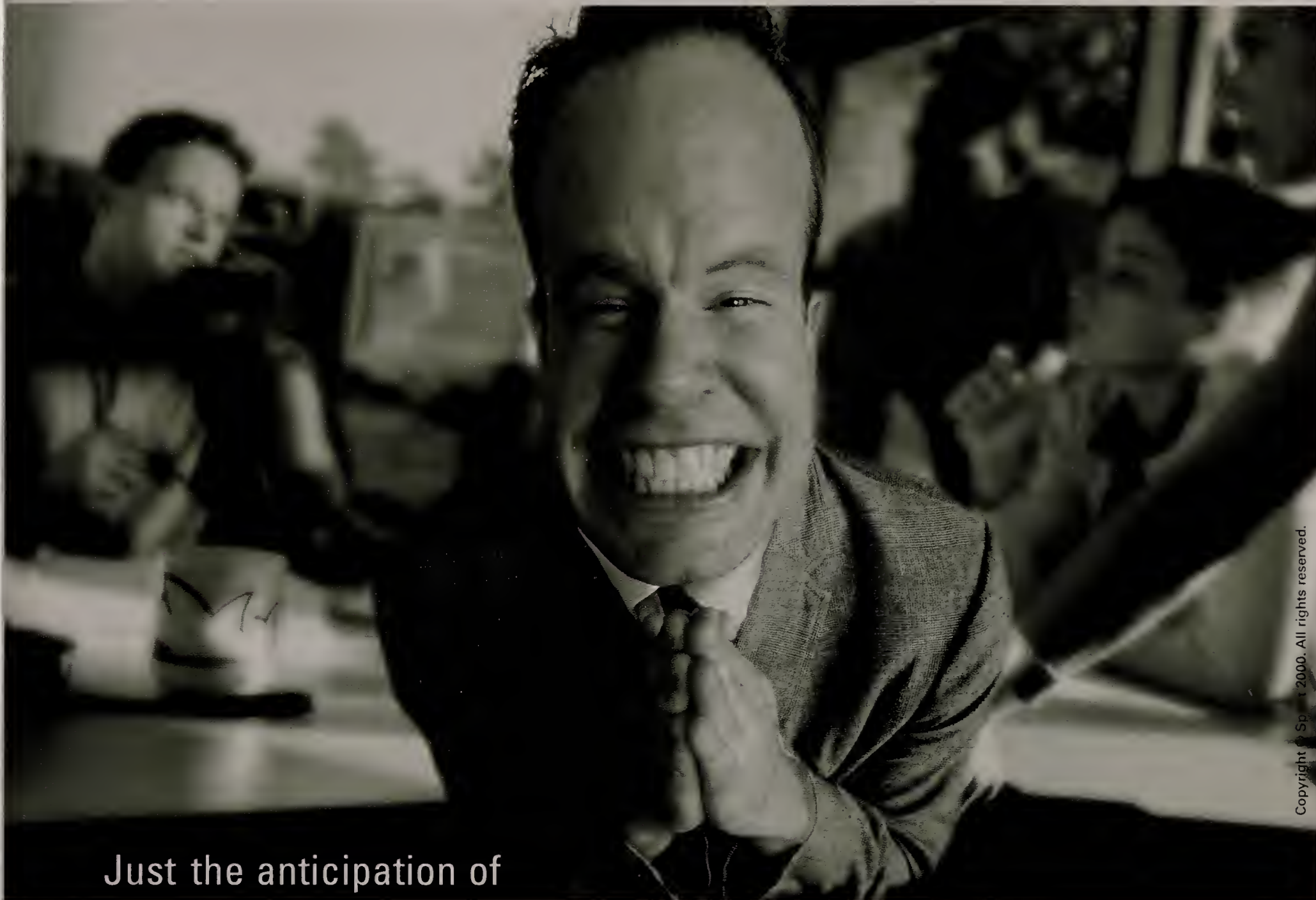


"If recruiters don't see women as a resource," Borg says, "they're crazy."

It's not just a question of womanpower fixing the staffing crisis. In Borg's view, IT sorely misses the female perspective. "I really believe women bring incredible richness and diversity of thought, perspective, new ways of looking at problems," she says. "But to get that, first you have to create an environment where women are really comfortable contributing." (See "10 Tips for Recruiting Women," Page 92.)

THE LONELY CUBICLE

Women who came into IT in the 1970s and '80s—and stuck to it—recall the loneliness they felt starting out. While at Digital, Borg stunned her coworkers at an internal conference with an impromptu speech titled "Why There Are Only Seven Women Left in Research at Digital," instead of speaking from a prepared text on microprocessors.



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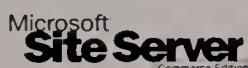
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Linda Scherr, program director of IBM Women in Technology (see "A Woman's Place," Page 84), says that when she was hired 27 years ago, she was the only woman among 80 trainees in her systems programming class. "I'm ashamed to say that I didn't look around and say, 'Where are the women?'" she says. "I looked around and said, 'Ain't I special!' I thought I was really something playing in the man's world. Now I can categorize women in two ways: There are women who can adapt themselves very well to the prevailing culture, which is the male-dominated culture, and do fine. I'm one of those people. What I have gotten an appreciation for is the other category of women who are not as comfortable



"A LOT OF THE [NEGATIVE] ATTITUDE IS SELF-IMPOSED. WOMEN THINK IT'S BORING, UNCREATIVE. BUT I WROTE CODE AND LOVED IT." —Donna Paparella, electrical engineer and LavaStorm project leader.

and for whom the prevailing culture actually will cause them to deselect themselves. That's what we have to fix."

Scherr says girls and women can easily imagine becoming lawyers or doctors because it's obvious what medicine and law do for society. "But switch to engineering, and it's not obvious what engineers do at all," she says. "In computer science, what's obvious is that these people work long hours. The role model is Dilbert, cubicles, dumb, geeky-looking people."

"Women are all about relationships," says Kris Van Buren, the founder of Yosemite Systems, an IT recruiting firm in Reno, Nev. "They respond to how they are treated in the interview process, the courtesy and the openness, attitude, environment—

all of these things are more important to women than men," she says. "Elegance is more important to women. Women don't go for that down and dirty, OK, doesn't matter, give me a cup of coffee. The guys don't really care. There are so many guys, they already feel comfortable."

FOOSBALL, ANYONE?

At a panel discussion last June at Harvard University's Internet & Society conference on gender issues in the IT workplace, Stefan Pagacik, a futurist with LavaStorm, an Internet engineering company with offices in Waltham, Mass., and San Jose, Calif., stands up to say that senior management at his startup wants to hire women—would hire *any* qualified individual, given the acute labor crunch—but women rarely apply or respond to recruiting efforts. "Why is that?" he asks. The mostly female crowd swivels to get a better look, and some let out a low, knowing, sisterly snicker.

LavaStorm's staff of 160 includes 37 women (or 23 percent). The CFO is a woman. Five of the engineers are women. One is a senior engineer and three others are programmers. But one-third of the women work in clerical jobs, the rest in human resources, design and technical writing. The IT staff is all-male.

Given the opportunities, especially the good pay, Jerry Patton, LavaStorm's vice president of human resources, also wonders why so few women apply. "We've had a few conversations here about how to hire women, how to locate them," he says. "But in all honesty, we haven't said, 'Gee, are there other ways to dig out women and talent we haven't tapped?'"

His recruiting methods are standard—Internet job boards,

direct-source recruiting (building lists, making calls), employment ads, job fairs and incentives for employee referrals. "Our projects are complex, challenging, leading-edge stuff," he says, citing the launch of Goldpocket.com, a live Internet trivia program that can handle more than 4 million concurrent users. "That's an advantage, to be able to tell our applicants that they'll be playing a role in this interesting, challenging project." On the money side, the pitch includes bonuses, profit sharing, stock options and fully paid benefits.

"Then," says Patton, "there's the fun part."

The company allocates 10 percent of its space to RAM (Recreational Activities for Motivation), a warren of play-



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rooms featuring Ping-Pong, foosball, air hockey tables, an indoor batting cage and a massage chair. A full-time "wellness manager" organizes tournaments and thinks of new games for the employees, whose average age is 33. Patton recites the dotcom mantra: "We work hard and play hard," though he admits the noise level from RAM can get a "little obnoxious." Says Patton, "It's not ideal when they start playing hockey. I can't get any work done, can't think straight. You listen long enough, you think somebody's having a baby in there."

He recalls one job applicant who told him she didn't think the "culture" would work for her. "We work in an open environment, and she mentioned something about preferring an office," he says. "Sometimes I wish I had a door to close too."

Jean Marzilli, LavaStorm's recently hired director of staffing, says she is committed to the idea of hiring more women but cites the "energy and effort that goes into finding those folks." Marzilli says she realizes that foosball probably is not much of a lure for women. "But the massage chair is awesome," she says. "It has music; you sit back and relax."

"We've talked about it," Marzilli adds. "What do women want? We joke, maybe have somebody to come in and do our nails? Probably we want practical things, not playthings, ways to simplify our lives, like a concierge service to pick up the dry cleaning or shop for food."

FEAR OF COMPUTING

After 15 years working in the all-male world of submarine combat control systems for The Naval Undersea Warfare Center in Newport, R.I., the din of foosball and table hockey tournaments does not faze Donna Paparella. An electrical engineer and LavaStorm project leader, Paparella finds her current environment cozy. "I ran into a few more problems working with military men who weren't used to having women in their arena or who didn't think the tech could be understood by a woman," she says. "But I've been in a male world for so long, I hardly notice it."

At the Undersea Warfare Center, she saw the difference women can make. "At submarines these are very focused men who dive into their piece and do their creative thing," she says. "The women were more practical; we brought the men back to reality."

As for women's IT aversion, Paparella thinks the problem is based on perception, ignorance and lack of exposure. "A lot of the attitude is self-imposed," she says. "Women think it's boring, uncreative. But I wrote code and loved it."

Paparella has listened to her 12-year-old niece tell her 11-year-old brother that his computer game interests are "silly" and that he spends time at the keyboard because "he's a boy."

Similarly, Paparella sees women friends with distorted views of tech careers. "Some of my girlfriends are their own worst enemies," she says. "I tell them, 'You could do this or that,

"THE WOMEN HERE MAY HAVE THE SENSE THAT THEY ARE NOT JUST CONTRIBUTING TO SOME COMPANY GETTING RICHER. THAT WHAT THEY DO MATTERS." —Deborah Bonnani, director of HR, National Security Agency.



run the place,' and they say, 'Oh, no!'"

"These days, I try to get my friends to send their résumés here, come in and talk. The contact is made, but it just doesn't happen."

MORE THAN A JOB

Last June, the National Security Agency (NSA) announced it was pursuing a government-industry partnership to manage and upgrade its IT systems, a dramatic admission of the vulnerability the highly secretive agency faces in a brutal labor market. Still, the agency, an arm of the Department of Defense that specializes in the protection of U.S. information systems and the production of foreign signals intelligence, and reportedly employs some 40,000 code breakers, eavesdroppers and others, headquartered at Fort Meade, Md., has fared better than most in hiring and retaining IT women. Forty-one percent of its computer scientists are

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women, 31 percent of the mathematicians are women and 11 percent of its engineers are women—all higher than the national averages in the private sector, based on information from the 1990 census.

How did the NSA do it, especially given the fact that it can't pay as well as the private industry? Bernard Norvell, an NSA technical director for Human Resources Services, says, "We can appeal to women with continuing-ed programs, onsite child care, flexible work arrangements for employees with child- and elder-care responsibilities and fitness centers. These things are big sellers, very enticing to women."

Deborah Bonnani, director for human resources at the NSA, says the agency's overall attrition rate of 5 percent to 6 percent is low in today's economy. "Among women recruits, we're not seeing any real dropout," she says. "I'm not saying we have a perfect environment, but we are trying. Our second-in-command in our tech organization is a woman. We have powerful, articulate

women who are role models. We hope that candidates will be hooked by the mission of contributing to national security. The women here may have the sense they are not just contributing to some company getting richer, that what they do matters."

WOMAN, ANIMAL OR FISH

At the Giga conference, a session on IT staffing makes no special mention of untapped female talent. During the breakout session, Giga analyst Kazim Isfahani says that 75 percent of all e-commerce projects are understaffed and underskilled. As a result, 90 percent of those projects will be late and over budget. "You can muck up your project in so many different ways," says Isfahani. "You just don't want it to be the people issue that is bringing you down."

Weary faces nod in agreement. Isfahani advises the recruiters to think beyond Internet job boards and job fairs and scour nightclubs and cafés for talent. It sounds desperate, but these are desperate times. When asked about specific tactics for recruiting women, however, Isfahani looks blank. "If an organization asks us how to recruit, they just want the skill. They aren't going to care if it's a man or woman, white, black or yellow, animal or fish," he says.

This kind of talk drives Anita Borg up the wall. "The recruiters need to do their homework, for Pete's sake," she says. "What they really need to do is ask women what they want and what is going to make them stay. For example, one of the things women say is that just knowing that a company really cares what [they] want makes a huge difference."

She cites issues of time, family and safety. For example, does the company pay attention to the safety of its female employees? Are there dark parking lots when they have to leave the office late at night? "IT doesn't pay any attention to those things very often," she adds.

The message is clear: What women want is a sense of purpose in their work. They also want to feel connected and needed. A little more kindness, some elegance—a little less foosball.

"The HR people already know that the current staffing problem is not going to be fixed by bringing in foreign workers to fill positions," says Borg.

"The impression I get is that they think it's a big deal to find women. They *think* they know what women want. But they need to check it out, ask what would make you come here, what would make you stay? They need to ask their current women what are the issues that would make your workplace better and actually act on it." **CIO**

10 TIPS FOR RECRUITING WOMEN

Material benefits are important, but so is the psychology of the workplace

- 1** Ask women in your IT organization for their perceptions about the work environment and ways in which it might be improved.
- 2** Find out what women want. If not foosball, how about concierge service to pick up dry cleaning and run errands? Women are looking for ways to simplify their busy lives.
- 3** Provide a work environment that takes into account safety issues, such as well-lighted, secure parking facilities.
- 4** Offer incentives/rewards for employee referrals.
- 5** Build a relationship: Follow up applicant interviews with e-mail or phone contact.
- 6** Network with grassroots organizations such as Women in Technology International (www.witi.com) to keep in touch with professional IT women's groups.
- 7** Encourage women applicants to meet women within the organization.
- 8** Read the latest tech study by the Association for American University Women (available online at www.aauw.com) to learn more about women's attitudes toward IT.
- 9** Provide options for flextime for employees with child- and elder-care needs; offer continuing education opportunities.
- 10** Create a work atmosphere that values diversity and encourages employees to freely contribute ideas. If women are not accepting your job offers, ask them why.

—C. Bentsen

Do you have a special insight into the difficulty IT has with women and the difficulty women have with IT? Tell Senior Editor Cheryl Bentsen at cbentsen@cio.com.



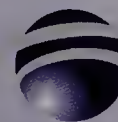
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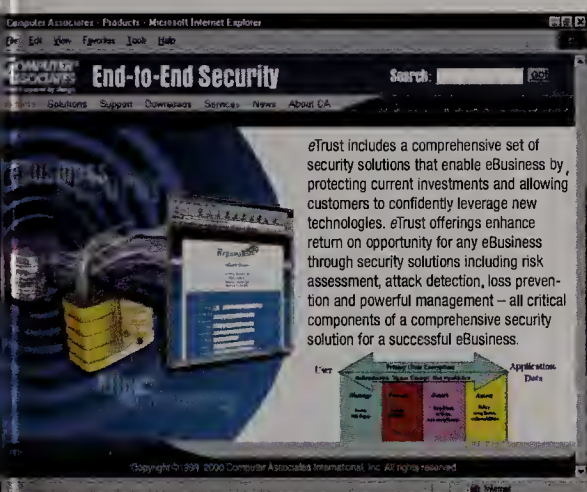
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AIN'T NOTHING LIKE THE REAL THING

Customers want to know the truth about whether a product on a website is in stock. Real-time inventory is the best way to tell them.

BY CONSTANTINE VON HOFFMAN





IT'S HIGH NOON

—does your website know where your inventory is? Most websites don't. And that often comes as a rude awakening to shoppers, most of whom assume that if an item is on a website, it's available for them to buy. Take Steve Katzman's too familiar tale of online-ordering woe. Katzman, CEO of Decoratetoday.com, went to the website of a very well-known brick-and-mortar retail chain to order some Calvin Klein blue jeans. He found a pair, bought them and then got an e-mail confirming that the retailer had received his order and was going to ship it to him. But five days later, just about the time he was expecting his designer jeans to arrive, Katzman got another e-mail that said, "Unfortunately, we had to cancel your order...for one of the following three reasons...." Katzman reacted the same way any Web shopper would: "I'll never go back there again," he says.

This is just one of the thousands of horror stories that have e-businesspeople around the world chanting the mantra "real-time inventory, real-time inventory." Real-time inventory management capability lets a company constantly track every product it sells from when it's manufactured, or when it arrives in its warehouse, to when it hits the buyer's door. The theory is that by integrating a website with a real-time inventory system, a company will never disappoint an online customer again, because its website will list only products actually in the warehouse, ready to be picked, packed and shipped (or would tell customers that something was on back-order but would be available within a certain period of time), and would reserve those products right when the customer places the order. But is real-time inventory on the Web a reality today? And is it really necessary for every Web business?

The answers to those questions are a qualified yes and yes. Some websites have done the necessary back-end integration to be able to tell their customers the truth about whether a product is in stock. But many have had to resort to workarounds that fall far short of offering real-time information. While those workarounds might be good enough for now, it is going to become increasingly important for companies to make the move to real-time

Reader ROI

- Learn why websites will need to offer real-time inventory information
- Understand some of the hurdles—and the costs—companies offering real-time inventory information face

PHOTO BY PHOTODISC

Web Architecture

in the future. Customers clearly want it: Displaying inventory availability on a website is one of the leading features that makes customers more likely to buy from or revisit an online store, according to a Jupiter Communications survey earlier this year. And companies that don't have real-time inventory capability will fall behind competitors that do, analysts say. "This capability will differentiate between those who thrive and those who don't," says Lora Cecere, research director for enterprise and supply chain management at the Gartner Group in Stamford, Conn. "When someone clicks on a website they don't want to hear 'next day.' They want to hear 'right now.'"

Right now, as in, "We'll get it out the door today." This type of immediacy is essential for Streamline.com, the Westwood, Mass.-based company that delivers groceries and household services to customers' homes. The dotcom would not be able to operate without checking inventory in real-time, says John Cagno, Streamline's vice president of information technology. How does he know? Because Streamline's website didn't do that when it was first launched—and it cost the company customers.

In the past, Streamline did not check inventory until after a customer had placed an order. If it didn't have what a customer had ordered, the crew member filling that order would guess what an appropriate substitution would be—say frozen strawberries if the order had called for fresh. As with all guesses, sometimes they were right and sometimes they were wrong, but they were never what the customer had ordered. And there's "a huge ripple effect" from not being able to deliver what customers want, Cagno says. Fielding customer service complaints takes time, margins erode, and "customer retention ultimately would be hurt," he says.

Today at Streamline, when customers complete an order they are actually reserving items that are either in the company's warehouse or that a supplier has confirmed as existing and on their way to the warehouse. Streamline didn't plunge headfirst into building real-time links between the website

For John Cagno, VP of information technology at Streamline.com, real-time inventory means that customers get what they order or find out before they leave the website that a product is out of stock.



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Bob Lewandowski, vice president of systems at ASAP Software, says real-time inventory is a must for his low-margin, high-volume business.

and the inventory system. It started by rolling out SAP financials, a four-month project, then decided to deploy SAP from end-to-end, which took eight months. It uses SAP's warehouse management system, which links receiving, picking and other warehouse func-

tions with the inventory control system, and SAP's online store module, which interfaces with order management, accounting and inventory control.

While it's clear that a company like Streamline—which deals with perishables

subject to crop failures or spoilage and has customers who are used to getting their groceries on the day they order them—needs real-time inventory, do businesses that sell nonperishables need it? Definitely, says Bob Lewandowski, vice president of systems for ASAP Software, a Buffalo Grove, Ill.-based software reseller. “We’re in a low-margin business, so it is absolutely essential that we automate every function we can,” he says. ASAP Software does about 25 percent of its business via its website. Without such tight integration between the company’s website and its back-end systems, a clerk would have had to print out every order and reenter it—a horribly inefficient process.

Lewandowski thinks his business has more in common with Streamline than many people realize. A perishable goods merchant’s success lies in drawing lots of customers, so that it can turn inventory quickly. Likewise, in order to survive and even flourish, ASAP has to sell as many units as it can as quickly as it can. “We are the grocery store of the software industry,” Lewandowski says. For ASAP, real-time inventory means being able to use fewer employees while still assuring greater customer satisfaction. It has lower overhead and can pass those savings online to customers, while at the same time giving them better service—thus making it more likely that customers will return or recommend the company to others.

It Ain't Easy Being Real-Time

Today's real-time inventory started out in the 1980s as so-called “available to promise” technology, software that let order management reps field inventory questions in call

“WHEN SOMEONE CLICKS ON A WEBSITE, THEY DON'T WANT TO HEAR ‘NEXT DAY.’ THEY WANT TO HEAR ‘RIGHT NOW.’”

—Lora Cecere, research director, enterprise and supply chain management, Gartner Group

NEFAB North America, Midwest "Go Live" with Intentia



Schaumburg, IL - NEFAB North America, Midwest Division recently celebrated a successful implementation of the Enterprise Application Solution, Movex. Richard Steele, Controller of NEFAB North America, Midwest accepted the "Go Live" award on behalf of the implementation team.



"Since going live in the U.S., our lead time has been cut by a week and we have been able to reduce our materials inventory by 20 to 25 percent" said Richard Steele. Steele adds that the Company is well positioned for e-business initiatives. "The ability to configure and enter customized product orders on-line opens the door to faster order processing and transaction cycles. This will enable NEFAB to sell direct to customers as well as third-party logistics providers."

NEFAB North America, Midwest is the U.S. division of Sweden's NEFAB AB, a global leader in the production of customized packaging solutions for secure shipping of transport-sensitive goods, such as electrical and electronic components and equipment, automotive parts, heavy machinery, and recreational vehicles.



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centers. It was a very basic tool and could give only rough inventory availability information, such as whether a particular item was in stock or how many of that item had been ordered. Since then, more sophisticated tools have been developed to allow supply chain optimization and intricate data analysis, such as being able to measure by product the speed that inventory turns over or the accuracy of inventory information. Other software, such as a combination of supply chain execution, optimization and visibility tools, can track the manufacture, movement, purchase and storage of goods, and integrate that information with an inventory system to give a view of what products are in the pipeline. "But the deployment has been slowed by back- and front-office integration [difficulties]," says Gartner's Cecere.

The Internet—the very thing that has made it possible to extend live inventory information out to the customer—has also made real-time inventory harder to do, Cecere says. Companies now get orders in many different ways—phone, websites, e-mail, fax or in-person at brick-and-mortar stores—making it harder to ensure that inventory information is accurate. And integrating transactions across all these channels is not just a matter of networking a bunch of computers, even if a company starts from scratch with brand-new technology and does not need to link a legacy database to a state-of-the-art system.

First, there's the very nonvirtual problem of how to tell the inventory system what items the warehouse has on hand in real-time. Typically that means physically scanning items as they enter the warehouse, with fixed or handheld scanners that communicate with the warehouse inventory system via radio frequency. The warehouse system, which monitors operations in that particular warehouse, then has to be linked to the master inventory system, which keeps track of inventory in all warehouses or from all suppliers.

Once that is done, the company has to address the question of latency—that is, how soon after information is entered into one

part of the system does it get disseminated to other databases throughout the system and to the customer? Let's say there are just two widgets left in the warehouse and three people each order one within minutes of each other. Does the last person find out right then that all the widgets have been taken before the customer completes his or her order? Or does the customer not find out until the order doesn't arrive? Also, the company must decide how to deal with "browsers," customers who put things into their shopping carts and then leave the site without completing the order. Should inventory be set aside for browsers when they put

items in their shopping carts or only when they actually pay? (See "Know When to Hold 'Em," above.)

At the same time, the company has to handle what are known as semantics issues. For example, what does something as simple as "one" mean in each step of the fulfillment process? When an item comes into the warehouse, one may mean one case or one gross, but by the time it gets to the ordering process it may mean one package or one item. Defining this correctly is the difference between shipping a customer one widget and shipping a customer 144 of them. While a lot of middleware on the market can handle this

Know When to Hold 'Em

Companies have to decide when to reserve inventory for customers—and when to risk disappointing them

ONE OF THE KEY DECISIONS to be made when linking a website to a real-time inventory system is at what point does a theoretical order become a real one? Shoppers often come to a website, place things in their shopping basket and then leave without either logging off or ordering. Given the high rates of shopping-cart abandonment, should an item be reserved in the warehouse every time someone tells a webpage he wants something?

Many companies don't think so, preferring to wait to reserve goods until after customers put their money down, says Lora Cecere, research director for



enterprise and supply chain management at the Gartner Group in Stamford, Conn. Completing an order and checking out puts an item on hold in the inventory management database and prevents other people from ordering it. This may be good for the company, since it doesn't tie up inventory unneces-

sarily. But it is problematic for the customer who takes a little too long to complete an order and gets to the checkout only to find an item that was in stock is now out of stock.

To avoid disappointing customers, some companies hold inventory when the customer puts it in the shopping cart, and then cancel it if the customer leaves the website without paying. Different cancellation rules can be set up for different customers. Victoria's Secret's website saves registered shoppers' carts for at least two days; anonymous shoppers' carts are saved for varying lengths of time, depending on how much space is left in the database and how long the cart has been abandoned.

—C. von Hoffman



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Decoratetoday.com ships 2.5 million packages a year without real-time inventory, but CEO Steve Katzman says his workaround—penalties for tardy suppliers and constant checking of orders—keeps customers happy.



kind of translation, getting it up and running is usually a slow, difficult task.

High Complexity, High Cost

Here's how the real-time inventory system works at ASAP: The company's custom-developed order management and inventory management system runs on an HP 3000.

Within 15 minutes of when new inventory arrives in the warehouse, the inventory database is updated. Product descriptions and SKU numbers are replicated from this system to a Microsoft SQL Server database, which Web customers can search; hitting the SQL database is faster than going back to the HP 3000 every time a customer wants to find a product. The product description and SKU information is replicated as a batch job every

hour (information on specific products can be updated more quickly, if needed). But when the customer chooses a product, the website makes a real-time call to the HP 3000 to check pricing, since the company centrally manages its pricing rules. And when the customer specifies the number of items he or she wants to order, the website makes a real-time call to the HP 3000 to check if the product is in stock. If the product



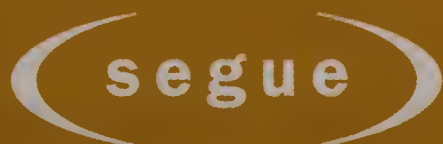
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is not in stock, the customer is told that the product may not be available and is given an estimate of when more stock is expected in the warehouse. The real-time calls are made using middleware in Order-Channel, Web-based e-commerce software developed by Fioravanti-Redwood International. The product is not reserved in inventory until the customer commits to the order.

As one might guess, this type of integration doesn't come cheap. The cost of developing a real-time inventory management system and linking it to a website depends on the complexity of the business's operation. But Cecere says even a basic system, which just provides middleware between a website and an existing inventory system, can run \$500,000 to \$1 million for software and system integration services.

Money is not the only hurdle stopping companies from going real-time. Decoratetoday.com, which sells wallpaper, blinds and other home decorations via an 800 number and a website, relies on other companies for manufacturing and distribution. So its website can only give customers information as good as the company gets from its suppliers and distributors, which typically don't have real-time inventory capability.

How has Decoratetoday.com managed to sell a selection of 300,000 products from 45 manufacturers, process more than 800,000 transactions and ship more than 2.5 million packages each year without real-time inventory? Katzman says Decoratetoday.com "will not sell any product from any manufacturer that...cannot guarantee to us that it will be available to ship within 10 business days." Its product database is updated several times a day, with some manufacturers faxing updates and others using e-mail. Those updates let the company know which items are in stock, which are back-ordered

FORTY PERCENT OF
E-COMMERCE EXECUTIVES
SURVEYED EARLIER
THIS YEAR PLAN TO
INTEGRATE THEIR
WEBSITES WITH THEIR
INVENTORY SYSTEMS
IN THE NEXT 12
TO 18 MONTHS,
ACCORDING TO JUPITER
COMMUNICATIONS.

and which are no longer available.

Doing things this way takes a lot of legalese and long hours. Decoratetoday.com has penalties written into its suppliers' contracts if they fail to deliver on time. The company also puts a lot of effort into confirming and checking customers' orders both electronically and, with suppliers who aren't tied into the net, by phone or fax. Katzman believes this process has been successful at keeping customers happy, given that 60 percent of business is from repeat customers and 25 percent is from referrals. But it is extremely labor intensive.

Such labor-intensive processes have a cost. And analysts and vendors say that when deciding whether it pays to offer real-time inventory information on the Web, it's important to consider the costs—and the potential savings from improved integration. ASAP's Lewandowski says online orders take about 20 percent less time to process than offline orders, and that online orders

also result in 5 percent direct labor cost savings.

Despite the potential savings, many observers believe competition will be what gets most companies to adopt real-time inventory. When one company in an e-commerce sector adopts it, other companies have to adopt it so that they aren't at a competitive disadvantage or they can get a competitive edge. True, the need for real-time varies somewhat by industry. The financial industry has had to be on the leading edge of real-time architectures—both because an hour can make a huge difference in their bottom line and because moving data around electronically is their business. Companies dealing with manufactured goods and retail sales have had more leeway when it comes to implementing real-time inventory systems. But according to a Jupiter Communications survey of e-commerce executives earlier this year, 40 percent of those surveyed

plan to integrate their websites with their inventory systems in the next 12 to 18 months. About the same number say they plan to integrate their websites with their fulfillment and other back-end systems.

Beyond just "keeping up with the Joneses," companies will be compelled to roll out real-time inventory capability to improve customer satisfaction. A company's website is where many customers have their first contact with the business, so everything about how the site operates—from a link not working to an order for a pair of blue jeans not being fulfilled—reflects on the company. Everything is exposed online for the customer to see, and there's no sales rep to act as a filter. Or, as Lewandowski puts it, "Our kimono is now wide open to the customer." **CIO**

Does your website tell customers the truth about inventory? Tell Senior Editor Sari Kalin at skalin@cio.com. Constantine von Hoffman is a freelance writer in Boston.



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Summer Olympics CIO **Ian Reinecke** trained long and hard to make sure the Sydney Games aren't another Atlanta debacle

LORD OF THE RINGS

BY LYNNE Z. RIGOLINI

With only days to go, Ian Reinecke, the CIO for the 2000 Summer Olympic Games, waits with the rest of the world to see the ultimate success or failure of his work. Since 1997 Reinecke has worked hard to develop IT strategies and partnerships designed, in his words, "to provide the athletes and spectators with information services in the most timely fashion as possible with seamless results." Unfortunately, what the world saw in Atlanta four years ago was anything but seamless. Headlines worldwide told the story of massive transportation and communication system problems—many of them attributable to the Games' main IT vendor, IBM. At one point, IBM's computer systems failed to report crucial scoring data; fans spent up to 45 minutes trying to get through metal detectors because there were too few to handle the crowds; and even the athletes had trouble arriving to their events on time because shuttle buses (which had been scheduled electronically) were late picking them up or took them to the wrong venues.



CIO Profile

This year you can believe that Reinecke and his staff, along with IBM's people, will closely monitor three technological systems: the official website (*www.olympics.com*); the Games' results system, which will generate data from the events for scoreboards, the media and the website; and the Games' management system, which will provide administrative systems and specialized applications. We spoke with Reinecke about Sydney's IT preparations, project management coordination and what his team has done to ensure that these Games, as Juan Antonio Samaranch, president of the International Olympic Committee (IOC), traditionally says (but didn't in Atlanta), are the best Games ever.

CIO: How did you become involved with Sydney 2000?

Reinecke: In 1996 the New South Wales government asked me to undertake a review of information technology in preparation for the Olympic Games. At that time I was provost chancellor at the University of Queensland, [a position] that included responsibility for a very large IT operation as well as many other services at a big university. I also previously chaired a group that reviewed information technology across the Commonwealth government, so I had done a number of reviews. At the end of that review, I was invited by the Olympic Coordination Authority [OCA] to work with them for the following three years, overseeing the implementation of technology across the government agencies and Olympic organization.

What were your recommendations?

The review revealed the need for greater coordination between the Sydney Organizing Committee for the Olympic Games [SOCOG] and the 20 government agencies in the state of New South Wales that were providing support services, such as transport and security to the Games. As a result, two groups were established. The first was a CEO Steering Committee on IT, which

SNAPSHOT

Name: Ian Reinecke

Title: CIO for the Sydney 2000 Olympic Games

Age: 55

Experience: Provost chancellor at the University of Queensland in Australia

Olympics Challenge: Oversee IT personnel within the Sydney Organizing Committee for the Olympic Games (SOCOG) and 20 government agency CIOs within New South Wales; manage relationships with major IT vendors, including Fuji Xerox in Auckland, New Zealand, IBM in Armonk, N.Y., Panasonic in Secaucus, N.J., Samsung Electronics Co. in Seoul, Korea, Sema Group in Montrouge, France, The Swatch Group in Biel, Switzerland, and Telstra Corp. in Australia

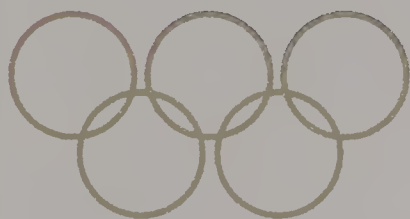
Term of Employment: Started Olympics work in 1997, expects to finish in December 2000

ence, and I'm sure IBM and certainly future organizing committees, including Sydney, have also learned from Atlanta.

The first [lesson] was the importance of end-to-end testing as far out from the Games as possible. The second was that there was sufficient risk in developing complex software for the Games. It was more prudent [for us] to use only tried-and-true technology and minimize leading-edge innovation.

There was talk last year that you were considering having spectators use smart cards. Is this the plan?

We were working on that proposal. [But] we are not going to use smart cards for the Olympic Games, really for a couple of reasons. The first is that the technology in terms of multiuse cards was not quite at the point where we felt absolutely confident. If I can add



"Everyone is very conscious of the risk of repeating mistakes that were made in Atlanta."

—Ian Reinecke

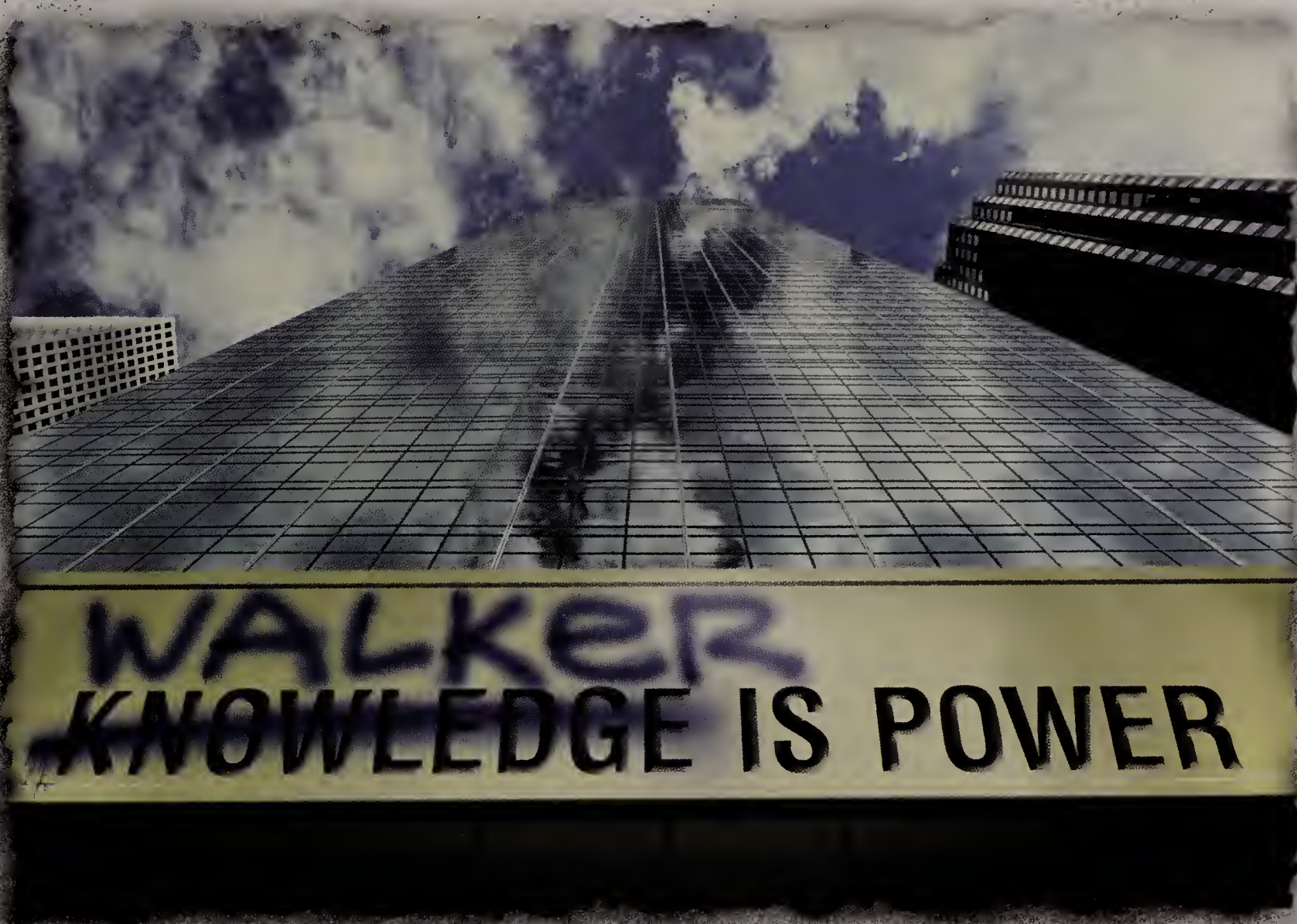
included the heads of the [OCA], SOCOG, the police, the premier's department, and the Olympic Roads and Transport Authority. A second-level group, which I chair, was formed from the CIOs of all the relevant government agencies and SOCOG to resolve issues of coordination.

What have you done differently from Atlanta?

Everyone is very conscious of the risk of repeating mistakes that were made in Atlanta. There has been a great deal of thought and effort that has gone into that. In many respects, Atlanta was a learning experi-

to that, one of the policies that has been adopted by the [SOCOG] is that its technology rollout be very conservative, so any technology that hadn't been tried and tested in the market by the end of [1999] would not be used in the Olympic Games.

The second [reason] is that the coordination issues required to bring together the four major transport agencies didn't fit the timetable for the Olympic Games. The transport agencies will move to smart cards, but they will not move to smart cards on a timetable that would comfortably fit with the Games. That implementation will occur post-Games.



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Are you going to be working right up until Sept. 15, when the Games start?

No, not at all. There have been—and this is one of the unique features of Sydney's preparations—a number of major test events of sports that have been held progressively over the past 12 months. There [were] two other major milestones. One [was] a full end-to-end test 100 days out and a second level, more complex test 50 days out. We will have tested everything fully by that stage.

ing competition. That overlaying infrastructure includes a provision of radio systems. For example, there are about 9,000 radio headsets that will be used at game times alone for internal communication across the workforce. In addition, many thousands of other radio headsets [are used] in other areas, such as security and in transport. The basic infrastructure is overlaid with a very complex network of technology that is then removed at the end of the Olympic Games.



"There are about 9,000 radio headsets that will be used at game times alone for internal communication across the workforce." —Ian Reinecke

What services is IBM providing to the Games?

IBM is actually providing service in two parts. The first is all the software associated with the result system, which is really the key piece of software in the Olympic Games. That is the software that generates the results and allows the results to be displayed on scoreboards, on the Internet and for television broadcasters. The other part is supporting the Internet side. The Internet side is being put together by contractors, and the lead provider of the infrastructure and in many respects a partner in the exercise is IBM.

Can you give an example of how your committee has overseen IBM's work?

The project management for the built infrastructure, which is a collection of venues around Sydney, has been supervised by the Olympic Coordination Authority. They have managed the major construction projects. I think everyone has acknowledged, including the IOC, that Sydney has been better prepared than any previous Games in terms of the built infrastructure. There are two layers to the infrastructure. One is the embedded infrastructure, which is part of the construction project and part of the responsibility of OCA. So, for example, Sydney Olympic Park is completely connected by fiber; it has its own closed-circuit television network and supports its own WAN.

In the case of the Games, this process is more complex. There is a second level of infrastructure referred to as the overlay. The overlay is all the cabling necessary to accommodate the positions to go to broadcast points and to areas where officials are oversee-

How large is your IT staff?

The technology staff within the government agency is very substantial but they report to their line management. On the vendor side, the vast majority are staff members, for example, of IBM, or of the other technology sponsors, and there is also a technology staff within SOCOG. I chair a coordinating committee that brings the senior line managers from government and from SOCOG together, and that's where we thrash out any interface problems.

Are you going to be in the back watching everything, or are you going to be in the stands watching the torch light up with everybody else?

I will be in one of two places: One is the technology control center, where all the technology centers are monitored through a commanded control structure, or I will be in the Internet control center, where, essentially, content is being produced for the Internet sites. That's where I expect to be most of the time during the 17 days.

Do you have any plans after the Games are over?

I haven't really thought very carefully [about that] because we are working at great pressure and a great pace, but I expect that I will continue my [independent] consulting role that I had before the Olympic Games in looking at complex systems in large organizations. **CIO**

Find Out More...

Will this year's Sydney Olympic Games—unlike Atlanta's in 1996—come off without a hitch? Check our website for updates following the Games, which run from Sept. 15 to Oct. 1. Hear Ian Reinecke's perspective on how the Games (and his IT systems) ran. Also, to hear Reinecke speak in-depth about his experience as the Olympics CIO and to learn more about the official Olympics website (www.olympics.com), tune into CIO Radio at www.cio.com/radio.

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Research Manager Lynne Z. Rigolini can be reached at lrigolini@cio.com.

PreShow Planner produced by



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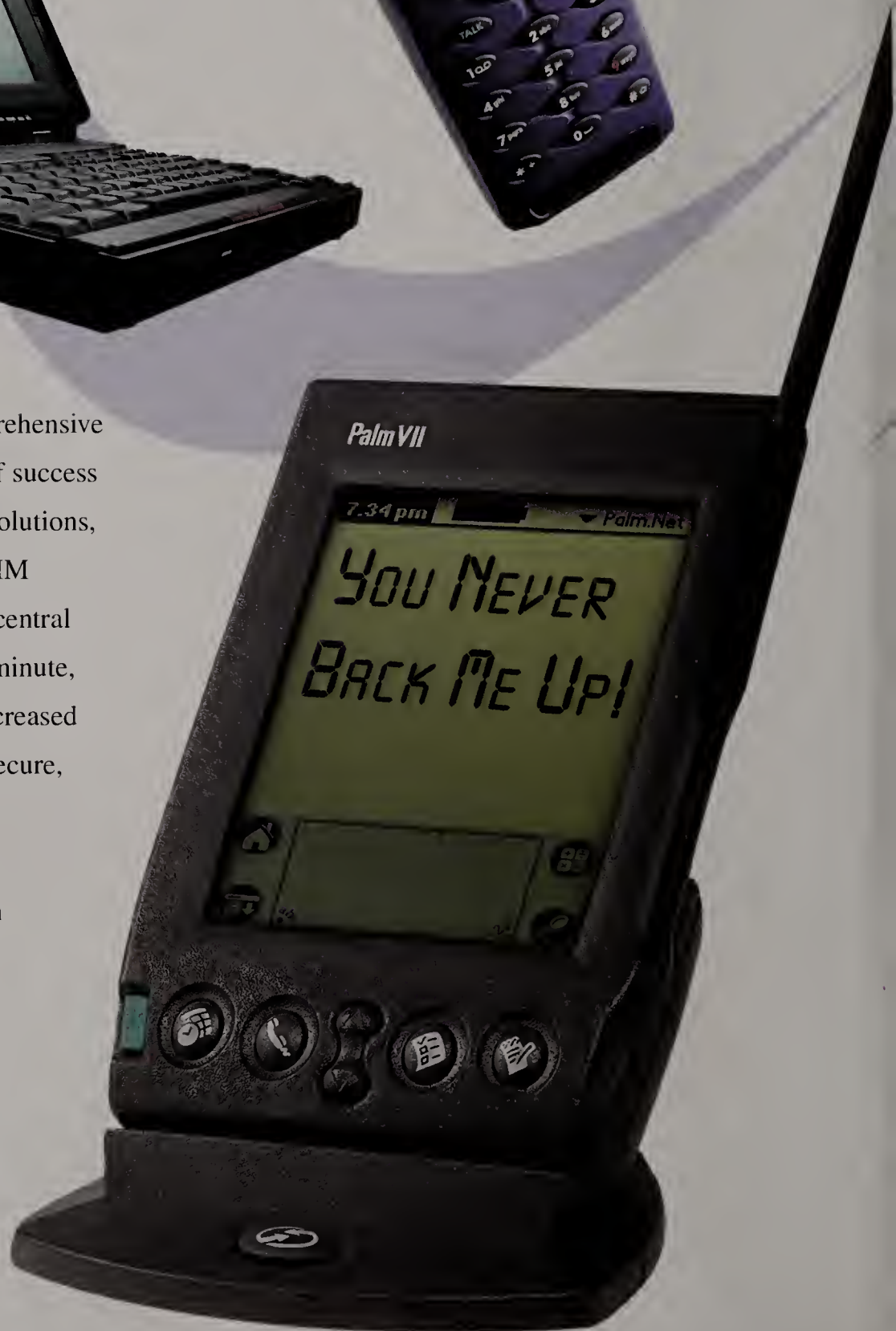
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SCHEDULE AT A GLANCE

Pre-Conference

SUNDAY, OCTOBER 15

- 9:00 am - 5:00 pm Wireless Data University
9:00 am - 6:00 pm Wireless Developer Seminar

DAY 1

MONDAY, OCTOBER 16

- 10:00 am - 11:00 am Keynote
11:00 am - 4:00 pm A.M. Oppenheimer Business Valuation & Sale of Business Seminar
11:15 am - 12:45 pm CTIA WIRELESS I.T. 2000 Educational Sessions
2:00 pm - 3:30 pm CTIA WIRELESS I.T. 2000 Educational Sessions
4:00 pm - 6:00 pm Exhibit Hall Preview & Reception
[Smart Pass Registrants, Executive Passport Registrants, SIS Registrants & Media Only]

DAY 2

TUESDAY, OCTOBER 17

- 10:00 am - 11:00 am Keynote
11:00 am - 5:30 pm EXHIBIT HALL OPEN
12:30 pm - 2:00 pm CTIA WIRELESS I.T. 2000 Educational Sessions
2:00 pm - 3:00 pm Coffee & Cookies on Show Floor
3:00 pm - 4:30 pm CTIA WIRELESS I.T. 2000 Educational Sessions
4:30 pm - 5:30 pm Exhibit Hall Reception

DAY 3

WEDNESDAY, OCTOBER 18

- 10:00 am - 11:00 am Keynote
11:00 am - 2:00 pm CTIA Board of Directors Meeting
11:00 am - 5:00 pm EXHIBIT HALL OPEN
12:30 am - 6:00 pm Ricochet Alliance Partner Conference
1:00 pm - 6:00 pm Microsoft Developers Conference
2:00 pm - 3:00 pm Haagen-Dazs Break on Show Floor

Post-Conference

THURSDAY, OCTOBER 19

- 8:00 am - 4:30 pm Ricochet Alliance Partner Conference
9:00 am - 6:00 pm Microsoft Developers Conference

KEYNOTES

Lucent Technologies
Bell Labs Innovations



NORTEL
NETWORKS
How the world shares ideas



M-COMMERCE & THE INTERNET ECONOMY October 16, 10:00 am - 11:00 am

E-commerce companies without a mobile strategy will miss the next multi-billion dollar evolution in the Internet economy. Hear how an e-commerce leader will protect and grow e-market share as it transitions from e- to m-commerce.

PORTALS & PIPES

October 17, 10:00 am - 11:00 am

Unmet demand for online access to the Internet gave rise to a new business model—the ISP. Ubiquitous access has driven the development of wide-ranging Internet applications that are ever-more integrated into our personal and professional lives. As a result, demand for anywhere, anytime access is about to explode. Now the battle begins for the next generation of service providers—the WISP.

WIRELESS IT FOR THE ENTERPRISE

October 18, 10:00 am - 11:00 am

The mobile workforce is growing, escalating demand for remote access to enterprise data. As the de facto leader in enterprise applications, Microsoft will be expected to provide robust end-to-end solutions—can they deliver? Paul Gross, Senior Vice President of the Collaboration & Mobility Group at Microsoft, outlines their strategy for serving the mobile enterprise.



Keynote Host

Thomas E. Wheeler

President and CEO, CTIA

SPECIAL INTEREST SEMINARS

SUNDAY, OCTOBER 15

WIRELESS DATA UNIVERSITY

9:00 am - 5:00 pm

hosted by

ANDREW SEYBOLD'S

OUTLOOK

Andrew Seybold/Alan Reiter's Wireless Data University (WDU) will present a unique, day-long tutorial on wireless/Internet. Attendees may choose from three concurrent morning tracks: "The Basics of Wireless Data Communications," "Marketing Wireless

Data Solutions," or "Wireless Internet and E-Commerce." The afternoon is a combined session with updated panel discussions.

To register, please call Rosalee Rhoads at Andrew Seybold's Outlook at 831-338-7701 x12, or you can

register online at www.wirelessu.com. Pre-registration for the day-long tutorial is \$245.00. Pre-registration for the "Graduate Course" (afternoon only) is \$185.00. On-site registration is \$299.00 (full day) and \$225.00 (afternoon only).

Wireless Data University registration is separate from CTIA registration.

Seating is limited. Pre-registration is recommended.

WIRELESS DEVELOPER SEMINAR

9:00 am - 6:00 pm

hosted by



Calling All Developers! WirelessDevNet.com is bringing you an information-packed wireless developer seminar the day before CTIA WIRELESS I.T. 2000 kicks off. Keynote speeches from industry leaders will set the tone for a day of technical sessions on topics such as enterprise application integration, content distribution and management, and mobile commerce and security.

1. Enterprise Application Integration—An in-depth look at the process of integrating mobile devices and applications with existing infrastructure. This includes topics such as transaction management, message queuing and

database development.

2. Content Distribution and Management—Using XML and structured back-end development processes to seamlessly distribute content to a wide variety of processes, devices and customers.

3. Mobile Commerce and Security—The technical ramifications of mobilizing your customer base or application. This will include a detailed look at security issues (including various encryption technologies and virtual private networks, or VPNs).

4. Notes from the Real World—Three presentations from systems integrators and/or corporations who have built applications for key vertical markets. This will include energy, financial, telecommunications, transportation and healthcare.

\$495 registration fee includes:

- Full Day Seminar Registration
- Catered lunch
- Copy of O'Reilly's new book "WML/WAP—The Definitive Guide"
- Wireless Developer Seminar/WIRELESS IT 2000 custom T-shirt
- Bound Seminar Notebook

- CD-ROM containing developer tools (\$1000 value) provided by co-hosting and contributing companies, all Wireless Developer Network online tutorials, and all Seminar slides/presentation info/tutorials.

HOW TO REGISTER

Choose

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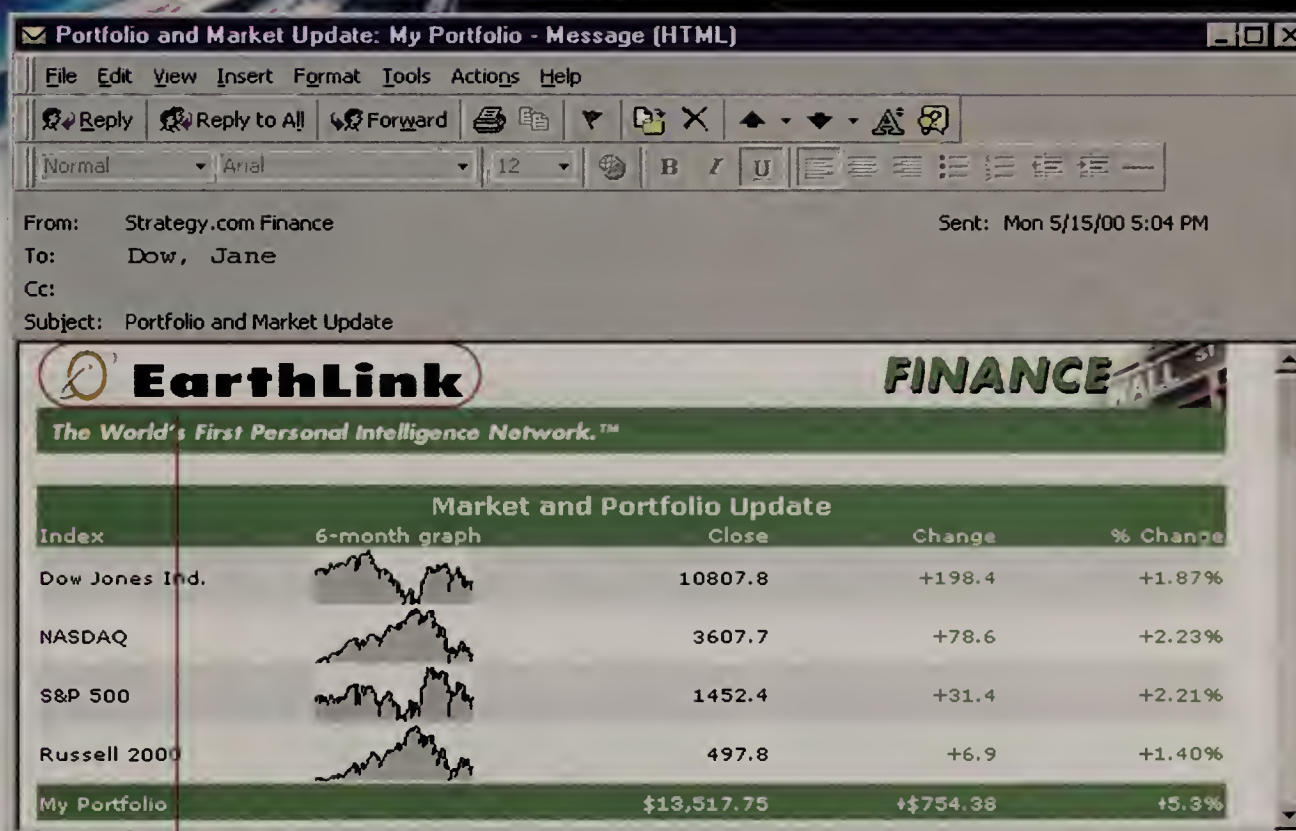
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SPECIAL INTEREST SEMINARS

MONDAY, OCTOBER 16

A.M. OPPENHEIMER BUSINESS VALUATION & SALE OF BUSINESS

11:00 am - 4:00 pm

hosted by

A.M. OPPENHEIMER INC.

This "how to" seminar gives you the practical tools applicable to sale-of-business or employee stock ownership plan (ESOP) or Internet start-up financing. You will learn:

- How to determine the true value of your business
- How to "package" your business to make it attractive to a buyer
- How to maximize the future potential of your business
- How to handle confidentiality requirements
- How to target and attract suitable buyers
- How to structure a sale that results in a favorable tax impact to the owners
- How and when to announce the sale to employees
- How to negotiate an increase in price on the basis of favorable deal structuring
- How to substantiate goodwill
- Plus many other key aspects of the process of valuing, selling and/or improving your business

HOW TO REGISTER

Choose

- "Smart Pass"

OR

- "A.M. Oppenheimer Business Valuation & Sale of Business Seminar" on your registration form.

WEDNESDAY, OCTOBER 18 & THURSDAY, OCTOBER 19

RICOCHET ALLIANCE PARTNER CONFERENCE

October 18, 2000, 12:30 pm - 6:00 pm

October 19, 2000, 8:00 am - 4:30 pm

hosted by
Metricom



If you were able to include 128 kbps wireless connectivity in your product, how will that change the power of your solution, and how can you profit? What if you offer the market full wireless networking to their corporate desktops, rather than e-mail without attachments and surfing without images? What if you made a PDA or subnotebook that could leverage the Internet as fluidly as a desktop on a LAN?

Join us for the first Ricochet Alliance Partner Conference, where you'll find out about Metricom's MCDN wireless data technology, offering

new opportunities for your technology solutions. We'll share our unique strategy and show you new possibilities created by:

- Deployment of our new Ricochet network in 21 cities (soon to be 46!), offering throughput of 128 kbps and connectivity at up to 70 miles per hour. This network offers the highest throughput and lowest latency at the best price of any wireless WAN
- Unique distribution strategy and partnerships with the world's top ISPs
- Secure remote access to corporate LANs via Ricochet wireless modems
- Explosive growth of wireless data in the enterprise space

We see an enormous pent-up demand for this speed, but we are only as good as our partnerships—and this is a great opportunity to talk.

Held at the Santa Clara Convention Center immediately following CTIA WIRELESS I.T. 2000, this promises to be one of the most interesting events you'll attend this year! So join us on Wednesday afternoon,

immediately following the conclusion of CTIA WIRELESS I.T. 2000. The \$399 fee (\$249 for CTIA/WDF members) includes meals on Wednesday and Thursday and a cocktail reception and celebration on Wednesday night. Attendees need only pay for transportation and lodging.

HOW TO REGISTER

Choose

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- ▶ A fast, customized, highly scalable solution from web site to wireless.
- ▶ An infrastructure that guarantees your content is reliably accessible from all mobile devices.
- ▶ No upfront costs.



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EDUCATIONAL SESSIONS



TRACK 1

M-COMMERCE & THE INTERNET ECONOMY



Mobile-Commerce and wireless transactional services are the consummate extension of the e-commerce revolution that is reshaping the business and consumer marketplaces. Come learn what applications are likely to hit the street—and mobile phones—first. From banking to gaming to shopping there's money to be made—grab your piece of the pie!

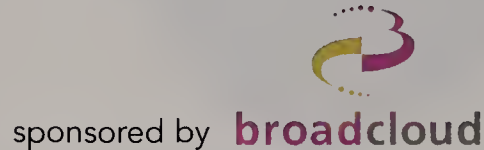


TRACK 2

PORTALS & PIPES



Providing wireless Internet access—there's an awful lot of talk and speculation about that—but who's actually providing it and is it profitable? If so, who profits—is it in being the conduit or the portal? or both? or neither? Is hosting applications the key to cracking the code in the wireless data market? Have these questions answered and more.



TRACK 3

WIRELESS IT FOR THE ENTERPRISE



The mobile workforce is clearly a growing sector and the demand on the part of mobile workers for access to enterprise data is going to continue to escalate, but how do you even begin to develop a mobile information management strategy? To reap the benefits of adopting mobile devices, IT managers must learn to take advantage of mobile devices without losing functionality or control. These sessions focus on developing a strategy to guide device adoption and integration as well as ongoing management and support.



SESSIONS SNAPSHOT

Monday, October 16
11:15 am - 12:45 pm

LOCATION BASED
SERVICES &
ADVERTISING



BORN TO SHOP...
ON THE RUN!



ADDRESSING THE ISSUES
OF MOBILITY WITH-
IN AN ENTERPRISE



BUILDING A WISP



Monday, October 16
2:00 pm - 3:30 pm

ENTERTAINMENT – THE
SURPRISING WINNER IN
THE RACE FOR
REVENUE



CORPORATE WIRELESS
DATA SOLUTIONS: WHY,
WHAT & HOW



CASE STUDIES &
EXAMPLES OF CORPORATE
WIRELESS DATA
SOLUTIONS



Tuesday, October 17
12:30 pm - 2:00 pm

SECURITY & CONSUMER
PRIVACY – TACKLING THE
#1 CONCERN IN
GOING MOBILE



DEVELOPING MOBILE
INFORMATION
STRATEGIES FOR
THE ENTERPRISE



INSTANT & UNIFIED
MESSAGING



VOICE PORTALS



Tuesday, October 17
3:00 pm - 4:30 pm

FINANCIAL SERVICES –
RAISING THE BAR BEYOND
STOCK QUOTES &
ACCOUNT
BALANCES



BUILDING YOUR WIRELESS
SYSTEM



WASPS – REDUCING RISK
IN EXTENDING WIRELESS
CONNECTIVITY TO
MOBILE WORKERS



VC INVESTING – THE HOT
AREAS IN WIRELESS



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EDUCATIONAL SESSIONS



MONDAY, OCTOBER 16

LOCATION BASED SERVICES & ADVERTISING

11:15 am - 12:45 pm

 E-commerce customers are oblivious to geography and have time to comparison shop. M-commerce customers depend on geography and are more likely to buy than shop. As a result, location-based services will be the killer app of m-commerce. Our panel of experts describes a variety of location-based technologies that will serve this burgeoning market.

J.F. Sullivan, VP, Marketing, Airflash, Inc.
Pam Kerwin, CEO, GeoVector Corporation
John Lankes, VP, Marketing @Road, Inc.
Steve Stutman, President, ClickaDeal.com

BORN TO SHOP... ON THE RUN!

11:15 am - 12:45 pm

 The business rationale for providing information services over wireless Internet is clear; but selling tangible products is more problematic. Nevertheless, leading e-tailers and e-tisers are betting that consumers want to shop... on the run!

Vikram Chachra, Co-Founder, SNAZ
Matt Champagne, VP of Mobile Solutions, eCash Technologies, Inc.

ADDRESSING THE ISSUES OF MOBILITY WITHIN AN ENTERPRISE

11:15 am - 12:45 pm

 An overview of the various ways that mobility impacts the business operations of the enterprise—mobile employees, mobile decision makers, mobile business partners and mobile customers. The costs of mobility, the impact on productivity and the benefits of bringing mobile solutions into the enterprise architecture. Issues such as costs, impacts, security and benefits will be discussed as well.

Joy Maguire, VP, Wireless and Mobility Solutions, Razorfish, Inc.

BUILDING A WISP

11:15 am - 12:45 pm

 Hear from the resellers, carriers and network operators on building a wireless Internet service provider business.

John Cornwell, Director, Strategic Alliances, Metricom, Inc.
Aaron Dobrinsky, President, GoAmerica
Kendra VanderMeulen, Senior Product Development & Strategy, PocketNet

ENTERTAINMENT – THE SURPRISING WINNER IN THE RACE FOR REVENUE

2:00 pm - 3:30 pm

 Entertainment applications are the #1 source of revenue for NTT DoCoMo's widely popular wireless Internet service. Hear about DoCoMo's successful offerings and from U.S. companies who are trying to crack the code on providing entertainment to wireless devices.

Patrick Boyle, CEO and Founder, Mobile Engines
Ginny Hutchinson, Chief Marketing Officer, lobox
James Newcomb, Chairman and CEO, Indiqu
Robert Tercek, President Programming Division, PacketVideo Corporation

CORPORATE WIRELESS DATA SOLUTIONS: WHY, WHAT & HOW

2:00 pm - 3:30 pm

 Why should you implement a wireless data solution? What solutions are available? How do you implement and how many devices? Have these crucial questions answered and more.

Bob Hathaway, VP, Engineering, Cerulean
Anthony Lapine, Chairman & CEO, Datalink.net
Larry Roshfeld, President, Aether Systems

CASE STUDIES & EXAMPLES OF CORPORATE WIRELESS DATA SOLUTIONS

2:00 pm - 3:30 pm

 Closely examine the process of "going wireless" and gain insight and knowledge directly from the users themselves. Learn what their challenges were and what the "pay-off" has been.

Steve Schramm, President & CEO, lcras

Moderator: Mark Desantels, President & CEO, Wireless Data Forum

THE RACE IS
A LOT MORE FUN WHEN
YOU'RE AHEAD OF
EVERYONE ELSE.



Geoworks' Mobile ASP™ (Application Service Provider) is a robust, sophisticated, and customizable mobile information solution for organizations that lack the time or resources to develop such services in-house.

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For more information, phone Geoworks Sales at 1 800 600 8023 or e-mail to sales@geoworks.com.

Geoworks. Mobilising the power of information.™

EDUCATIONAL SESSIONS

TUESDAY, OCTOBER 17

SECURITY & CONSUMER PRIVACY – TACKLING THE #1 CONCERN IN GOING MOBILE 12:30 pm - 2:00 pm

 Establishing a security solution that meets the needs of users and content providers alike is a fundamental key to success in m-commerce. How will wireless and e-commerce companies safeguard consumer privacy in the world of m-commerce?

Nicolas Lorain, Senior Product Manager, Consumer Technologies Group, Sun Microsystems
Jon Oakes, CEO & Co-Founder, ThinAirApps
Robert Williams, Senior VP, Product Development, Certicom
Joan Ziegler, CEO & Co-Founder, Privasys

FINANCIAL SERVICES – RAISING THE BAR BEYOND STOCK QUOTES & ACCOUNT BALANCES 3:00 pm - 4:30 pm

 Nearly 40 million wireless subscribers will have financial services in the next 3 years. Investment banking houses and application/service enablers describe their strategy for meeting demand.

Charlotte Burke, VP, Services, Marketing & e-Commerce, BCE Mobile Communications, Inc.
Jacob Goldman, Director of Business Development, Financial Services, Ericsson Internet Applications
Kevin Parks, VP, Access Devices and Distribution Technology, Citibank
Jonathan Prial, Director of Marketing and Strategy, IBM Pervasive Computing Division
Nick Weir, President & COO, Strategy.com

Moderator: Charlie Baxter, CEO & President, E-Translate

DEVELOPING MOBILE INFORMATION STRATEGIES FOR THE ENTERPRISE 12:30 pm - 2:00 pm

 Information management is facing a new set of challenges as mobile devices proliferate throughout the corporate environment. IT managers must determine how to take advantage of these mobile devices without losing control or functionality. Let our experts show you how.

Jim Cavalier, Product Manager, Lotus Development Corp.
Holmes Lundt, VP, Business Development, Extended Systems
Stephen Maloney, President & CEO, i3 Mobile
Kit C. Young, Director, iConnectivity, Compaq

BUILDING YOUR WIRELESS SYSTEM 3:00 pm - 4:30 pm

 Rolling out a wireless data solution requires an effective wireless system, which is more than simply adapting web content to a small screen. It involves the overall system architecture, the various system components, procedures for installation and integration management and support of the system.

Ed Coleman, Sr Mgr, Mobile Internet Market Development, Lucent Technologies
Jim Debelina, Director Enterprise Solutions, Motorola
Sergey Fradkov, CTO, w-Trade Technologies
Hermon Pon, CTO, Nortel Networks
Ray Taylor, Wireless Evangelist and Business Development, AlterEgo Networks

Moderator: Brenda Lewis, Principal, Transactions Marketing



INSTANT & UNIFIED MESSAGING 12:30 pm - 2:00 pm

 Messaging is already an important application platform in Europe and Japan. The phenomenon is emerging in the U.S. as well. Come and learn about the capabilities of this increasingly potent communications tool.

Chuck Ennis, President & CEO, Roku
Chris Sanders, President and COO, Vast Solutions
Joe Staples, Executive VP, Corporate Marketing, AVT
Patrick Sweeney, Director, Marketing, TeleCommunication Systems
Bill Wolfe, GM, Unified Communications Software Division, Cisco

WASPS – REDUCING RISK IN EXTENDING WIRELESS CONNECTIVITY TO MOBILE WORKERS 3:00 pm - 4:30 pm

 Wireless data transmission is inherently complex. Mobile workers using multiple devices and various operating systems to access corporate data only adds to the complexity. As a result, corporate IT managers often forgo providing wireless connectivity. Now a business model has stepped in to fill the void—the WASP.

A. Rick Burke, CEO, Lumenix
David Grannan, President & CEO, Geoworks
Dayakar Puskoor, CEO, JP Systems
Bryan Wargo, President & CEO, 2Roam
Dave Whalen, VP, Sales & Marketing, Wireless Knowledge

VOICE PORTALS 12:30 pm - 2:00 pm

 Voice access to Internet-based content is going to become increasingly important. In the near future, carriers will provide customers complete sets of applications and services based on voice. Hear the latest from voice technology providers.

Mikael Berner, Co-founder & CTO, BeVocal
Brian Demers, VP & GM, New Network Services Business Unit, Natural Microsystems
Bruce Eidsvik, P. Eng., VP, Sales and Marketing, VoiceGenie Technologies, Inc.
Kathy Frostad, Director, Telecomm Marketing, Nuance
Scott McGlashan, CTO, PIPEBEACH

Moderator: Mark Desantels, President & CEO, Wireless Data Forum

VC INVESTING – THE HOT AREAS IN WIRELESS 3:00 pm - 4:30 pm

 Telecom financing continues to run at an all-time high with \$17.22 billion invested so far this year. Last year, all the rage was broadband communications—now it's all things wireless, particularly wireless Internet. What are the hot areas in wireless? What are the current valuations and the reasons for them? Hear directly from our panel of VCs.

Ed Acosta, President & CEO, BroadCloud Communications, Inc.
Mark Ein, Founder, Venturehouse Group

Moderator: Elliott Dahan, Partner, The Growth Group

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mobile
Commerce

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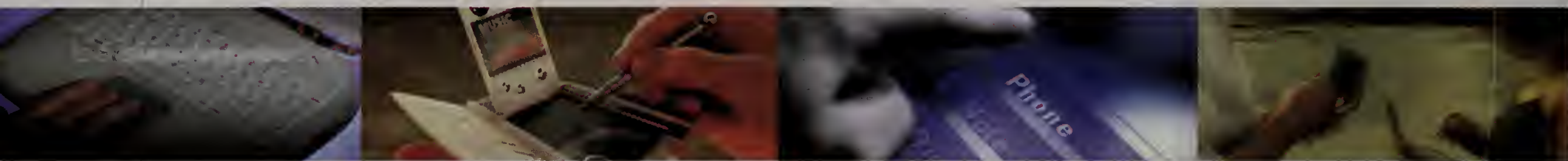
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WHY wireless will be part of your FUTURE



Every day in the United States, nearly 46,000 new subscribers sign up for a wireless communications service. That's a new subscriber roughly every two seconds. By midsummer 2000, the number of wireless subscribers in the U.S. approached 96 million.

And U.S. citizens and businesses are playing wireless catch-up to Europe and Japan. In Europe, for instance, wireless devices outnumber personal computers. By 2005, analysts estimate, more than 1.25 billion people worldwide will be using wireless phones.

Most of them, certainly, will be talking. But these days the wireless world is quickly going digital.

Wireless networks are morphing into infrastructures able to transmit voice and data signals at faster and faster speeds.

Wireless phones are morphing too—into a variety of digital wireless devices able to communicate data signals as well as voice signals. Some will browse the Internet; others will download databases or upload location data. Nobody's entirely sure which applications will thrive, but the rich potential of an anywhere, anytime computing/communications infrastructure is widely appreciated.

And it's closer than you might think. By mid-1999, digital wireless subscribers made up almost 50% of the U.S. total. They are attracted by several immediate virtues—better coverage, less noise interference, lower charges (thanks to systems that can handle more calls per channel)—as well as the budding opportunity to try new kinds of features, like short messaging, which enables wireless packet data communications.

HOT, HOT, HOT — A BROAD NEW MARKET EMERGES

So what used to be a narrow niche for wireless data—specialized mobile radio systems to handle the dispatch needs

OF PROTOCOLS AND POLITICS

For years, wireless networks have been regarded as too slow—at 14.4Kbps to 19.2 Kbps (bits per second)—or anything other than specialized functions like emergency services and warehouse inventory management.

But new kinds of applications—like wireless banking—are fast becoming popular in Europe and Japan. U.S. companies and customers wondering why such services haven't made it to their airwaves are discovering that the reasons concern not technology, but protocols and politics.

Interoperability challenges

In the U.S., four different wireless standards prevail, three digital and one analog, and carriers have been reluctant to forego these profitable, albeit proprietary, protocols. For wireless users, this means different capabilities and technologies, depending

on where you are and which carrier you use.

Europe and most of Asia, in contrast, has adhered to just one standard for cellular voice networks, GSM (the Global System for Mobile Communication) and benefited from the resulting lower connectivity costs and handset prices. What's more, GSM phones enable widespread roaming. And European cellphone users don't have to pay for calls received on the wireless devices; their subscription fee covers that. No wonder Europeans have more cellphones than PCs.

Over the next few years, U.S. wireless users will likely have to rely on a podge of standards as industry players reach agreement about future standards. That means multi-band phones and devices operating on AMPS (Advanced Mobile Phone Service), CDMA, GSM/TDMA (Time Division

(continued on page w18)



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upwardly
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**Who is upwardly mobile? See on our Web site at:
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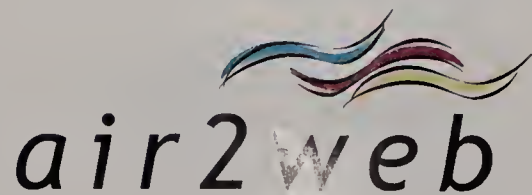
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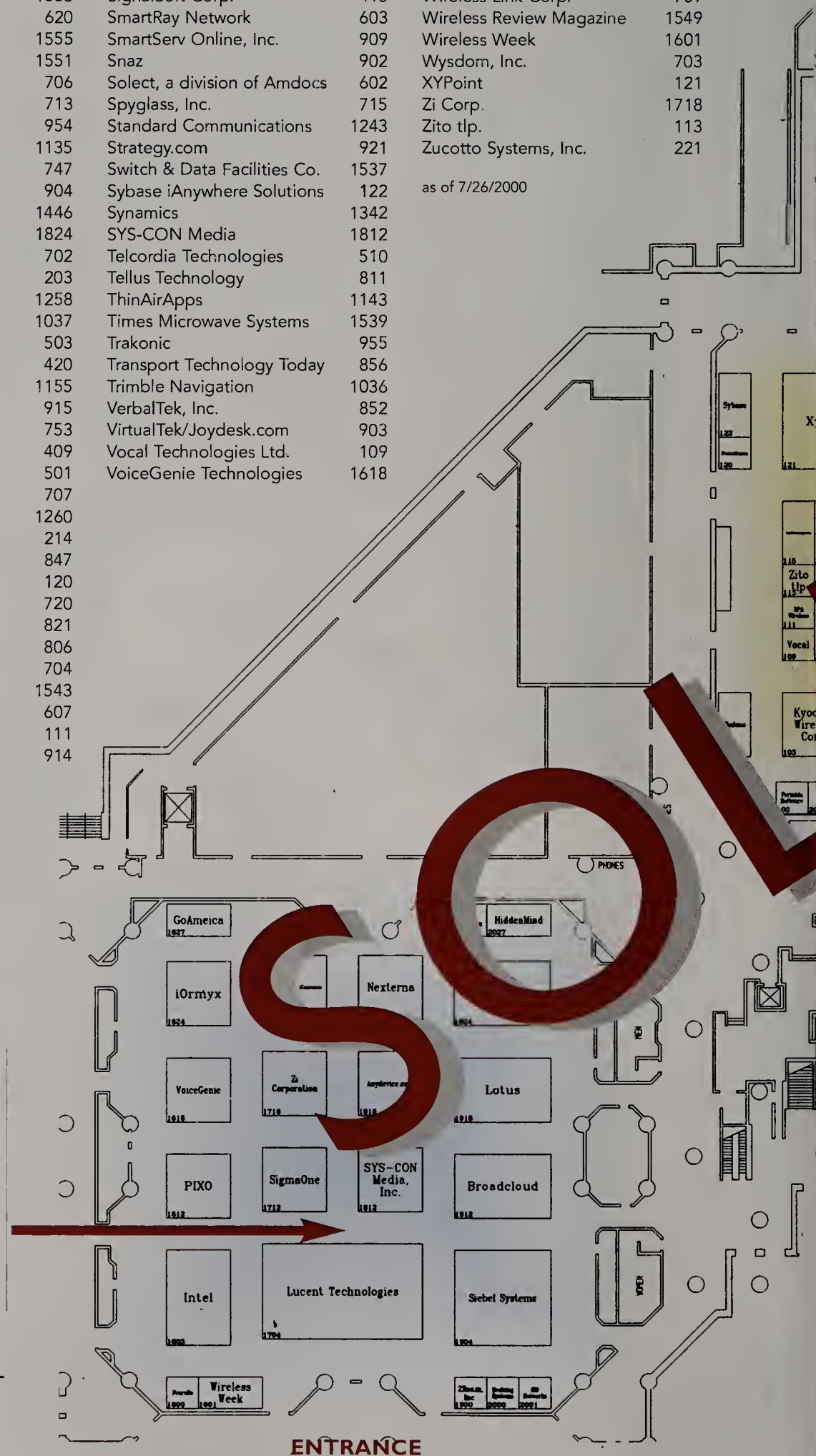
k i n d a

p r e p a r e d

FLOORPLAN & EXHIBITORS

COMPANY	BOOTH #	COMPANY	BOOTH #	COMPANY	BOOTH #	COMPANY	BOOTH #
@Road.com	807	LiveMind	943	Schafer Corp.	539	W@P Forum	1051
2Roam, Inc.	1900	Lucent Technologies	1704	Screaming Media	900	WIPRO Technologies	212
AdaptiveInfo	1058	LynkUs.com	941	Sierra Wireless, Inc.	613	WiredPocket	1447
Aeris.net	829	Metricom, Inc.	1043	SigmaOne	1712	Wireless Data Forum	735
Afaria, Inc.	1334	Microsoft	1353	SignalSoft Corp.	415	Wireless Link Corp.	709
Air2Web	947	MobileEngines	620	SmartRay Network	603	Wireless Review Magazine	1549
AirDesk, Inc.	1247	MobileShift	1555	SmartServ Online, Inc.	909	Wireless Week	1601
AirNet Communications	1253	mobilestop	1551	Snaz	902	Wysdom, Inc.	703
AIRTIS	939	Mobilize, Inc.	706	Solect, a division of Amdocs	602	XYPoint	121
Alterego Networks	910	Mobilicity, Inc.	713	Spyglass, Inc.	715	Zi Corp.	1718
Antel International, Inc.	1038	Motient Corp.	954	Standard Communications	1243	Zito tlp.	113
AnyDevice	1818	Motorola	1135	Strategy.com	921	Zucotto Systems, Inc.	221
AnywhereYouGo.com	115	NeoPoint, Inc.	747	Switch & Data Facilities Co.	1537		
Aspiro, Inc.	505	NetMorf	904	Sybase iAnywhere Solutions	122	as of 7/26/2000	
Astata	853	Nextair	1446	Synamics	1342		
AT&T Wireless Services	315	Nexterna	1824	SYS-CON Media	1812		
AU-System	1540	Noesis, Inc.	702	Telcordia Technologies	510		
AVIDWireless	808	Nokia	203	Tellus Technology	811		
Baltimore Technologies	760	Nomadix, Inc.	1258	ThinAirApps	1143		
BellSouth Wireless Data	509	Nortel Networks	1037	Times Microwave Systems	1539		
Blue Caribou	1928	Notwired	503	Trakonic	955		
BlueKite.com	1542	Novatel Wireless	420	Transport Technology Today	856		
Brightpod ASP, Inc.	1346	Numerex Technologies	1155	Trimble Navigation	1036		
Broadbeam Corp.		OnStar	915	VerbalTek, Inc.	852		
(formerly Nettek Systems)	1435	Orsus Solutions	753	VirtualTek/Joydesk.com	903		
Broad Cloud Communications, Inc.	1912	Paradigm4, Inc.	409	Vocal Technologies Ltd.	109		
BulletIN.net, Inc.	1034	PCS Innovations, Inc.	501	VoiceGenie Technologies	1618		
Cellexchange	757	Pen Computing Magazine	707				
Cellmania	735	Pipebeach AS	1260				
Centurion International, Inc.	1443	PNI Technologies	214				
Certicom Corp.	508	Point.com	847				
CITEL, Inc.	413	Prairie Comm, Inc.	120				
Classwave.com	515	Qsent, Inc.	720				
Clickservices.com, Inc.	935	QUALCOMM, Inc.	821				
CommNOW.com	1358	Racal Instruments	806				
Corsair Communications	635	RCR/Global Wireless	704				
Diversinet Corp.	201	Research In Motion	1543				
eCash Technologies, Inc.	952	RF Solutions	607				
eDispatch.com Wireless Data	512	RPA Wireless	111				
Emperative, Inc.	817	RSA Security	914				
ESRI	1442						
Everypath	859						
Evolving Systems	2000						
Exalink	641						
Extended Systems	520						
First Access, Inc.	1042						
Fitch, Even, Tabin & Flannery	1547						
Formida Software	100						
Geoworks	647						
GiantBear.com	215						
Group Serve, Inc.	208						
GTRAN, Inc.	857						
i3 Mobile, Inc.	629						
iConverse	1823						
Icras, Inc.	729						
iDini Corp.	803						
Infinite Technologies	812						
Infinity Molding & Assembly	1441						
InfoUSA.com	801						
Infowave Software	514						
Invertix Corp.	1149						
iormyx	1624						
lpmobile, Inc.	1347						
iXS Networks, Inc.	2001						
KachinaGuide	400						
Kivera	653						
Kullman Industries, Inc.	1000						
Kyocera Wireless Corp.	103						

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WHY WIRELESS WILL BE PART OF YOUR FUTURE

of police and taxi drivers, and private microwave data networks serving transportation companies, field service operations, etc.—is being transformed into one of today's hottest markets.

Advances in technology—small, digital devices and data compression improvements—are making wireless data communication more convenient and reliable. Regulatory decisions, such as licensing new spectrum for cellular technology and other evolving applications, have carved out some growing room for a new wireless infrastructure. Add to that already combustible fuel the fire of explosive Internet development and it's little wonder that so many communications and computing industry players are converging here.

They bring with them:

- **A blossoming collection of new data-enabled devices**—including personal digital assistants (PDAs), handheld computers, smart phones, wireless modems, two-way pagers. Some emphasize small size, others push performance and flexibility.
- **The money to build and improve network infrastructures and sort out competing protocols and standards.** A second generation of digital cellular protocols has already upstaged first-generation analog cellular standards. Now an emerging third generation—3G—promises to not only boost voice quality but also to raise transmission speeds (from 9,500 to, potentially, 2.5 million bits per second), thereby spawning new kinds of wireless data applications.
- **The motivation to invent new services and content that work,** notably short messaging services (SMSs), wireless e-mail, location-based services and what's being called mobile commerce, or m-commerce.

WHO CARES? ALL THE RIGHT PEOPLE

Unlike their forebears, today's emerging wireless data services and capabilities appeal to just about everybody. Many U.S. consumers—about one in four, according to recent survey research conducted for the CTIA by Peter D. Hart Research Associates (The Wireless Marketplace in

Multiple Access). U.S. carriers are working to boost wireless network speeds and some expect to offer better than 100K bit/sec soon.

WAP

Worldwide wireless service providers are working hard to deliver Internet access to wireless devices. For these efforts, one de facto standard—the Wireless Application Protocol (WAP)—already dominates.

WAP will work with any type of underlying wireless network architecture, so developers can focus on applications rather than devote time and resources to coping with incompatible offshore and U.S. standards. WAP relies on standard web programming, placing its own WAP gateway in the request/response cycle. So, in byte code, a wireless device requests a URL,

whereupon the WAP gateway server decodes and decompresses the request and sends it to the appropriate web server as an ordinary HTTP request. The same transaction repeats, in reverse, when the Web server responds.

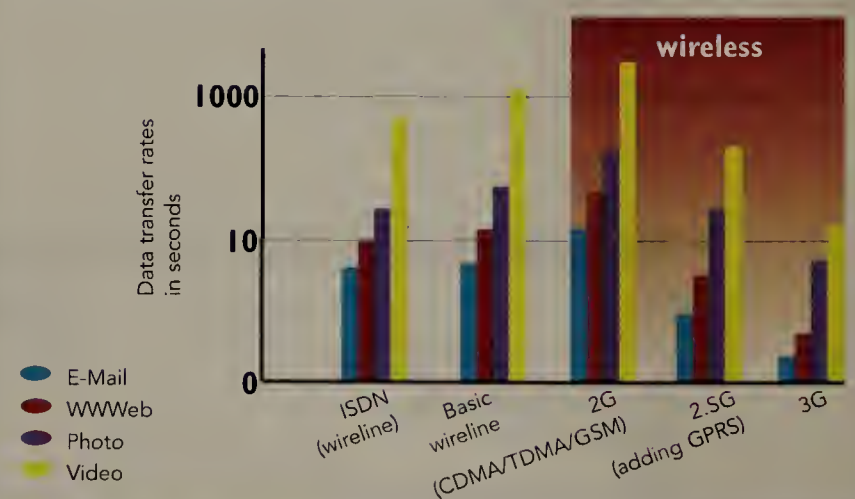
As the means to make wireless handsets Internet-capable, WAP will rule the world. Market researcher International Data Corp. predicts that more than one billion WAP-enabled cellphones will access the Internet in 2003, up from 99 million this year.

The third generation

Further out, work is underway on a third-generation wireless protocol that can boost transmission speed to between 300Kbps and 2Mbps, passing calls seamlessly across formerly incompatible networks.

(continued on page w20)

MOVING DATA: HOW FAST DOES IT GO?



AnyWay

AnyTime

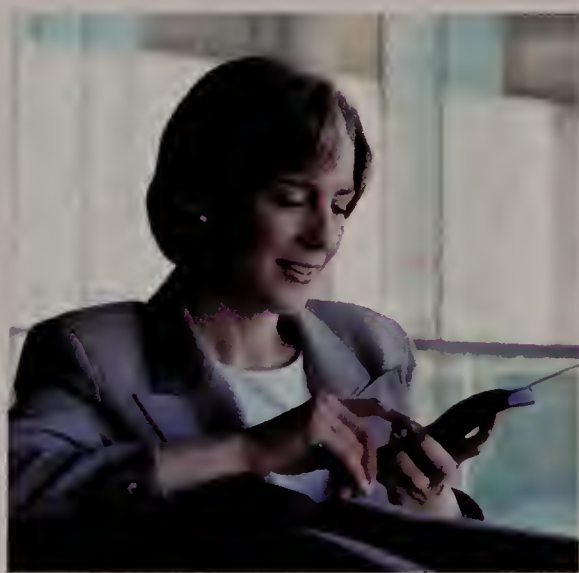
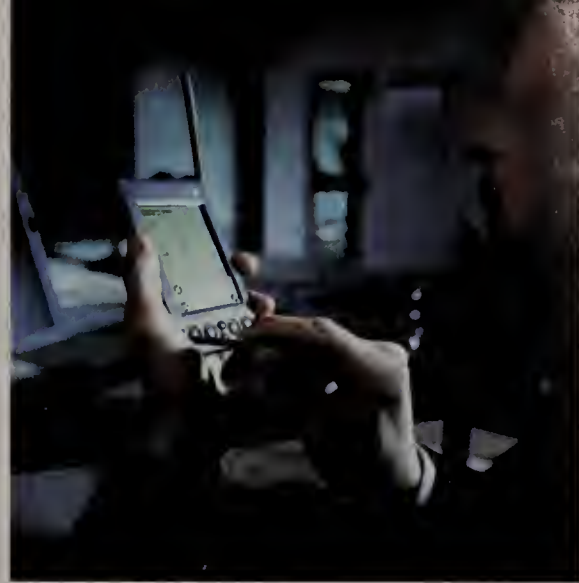
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www.anydevice.com



WHY WIRELESS WILL BE PART OF YOUR FUTURE

2000)—are expressing strong interest in wireless data services, including e-mail, text messaging, Internet access and online shopping. Another 30 percent have expressed some interest.

What's more, among those segments of the cellphone-using U.S. public that are the industry's best customers—such as heavy users, likely upgraders, those who regularly use their phone's features, those who believe they could not give up their cellphones for three months, and 18- to 34-year-olds—strong interest in wireless data services ranges about 60 percent higher than the overall average. Among business users, meanwhile, strong interest in wireless phones capable of providing data services is even greater. Business users expressed high levels of interest in wireless data capabilities about twice as often as personal cellphone users did.

And where there's this kind of interest, outright demand follows close behind.

ARE YOU READY FOR WIRELESS? THAT MEANS IT'S TIME TO PREPARE . . .

... **For WISPs and WASPs.** Wireless Internet service providers and wireless application service providers will be spreading wireless capability and applications all over the world. What kind of influence will their efforts have on businesses and their customers?

... **For m-commerce.** If yours is a business that cares about e-commerce, then you probably need to think about whether your customers want m-commerce. They are not the same, neither in terms of function nor content: effective Internet browsing, for instance, demands broadband speeds and fancy displays, but wireless transactions must be leaner and more focused, not only because transmission speeds remain slower, but because customers can be in diverse and demanding environments.

That means it's time to get an education about what will make m-commerce tick. Will it be banking and investment services—doing money transfers and day trading from the middle of rush-hour gridlock? Will it be e-mail and text messaging? Will it be location-based services and advertising—"Hey, we're right around the corner so come on in and enjoy our happy hour special"?

Expected to be available (in Japan and Europe) in the next 12 to 18 months, 3G wireless devices will also offer the IP (Internet Protocol) compatibility companies need to integrate wireless capability into the corporate IT panoply.

The road to 3G wireless has some twists and turns. Both GPRS (General Packet Radio Service) and EDGE (Enhanced Data Rates for Global Evolution) services, which are GSM/TDMA-based, will contribute interim solutions to bridge today's assorted wireless

protocols to third-generation. These will compete with non-GSM infrastructures as carriers forge the wireless future.

What's inevitable is that wireless protocols will pick up both speed and IP capability. And this, in turn, will inspire many applications and uses for those billion-plus carriers of wireless devices. Chances are, some of those applications will make a big bottom-line difference for your organization. Start thinking about them now.

While there's still time.

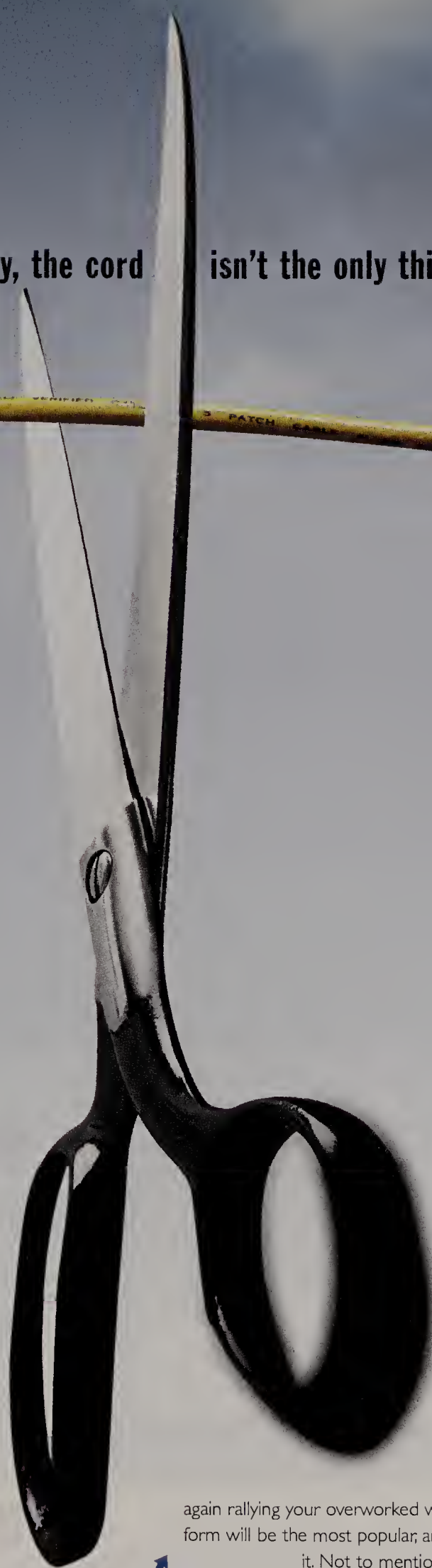
And what about security? After all, they won't come if they're scared of a rip-off. Will solutions like radio frequency fingerprinting, personal identification numbers, roamer verification, and reinstatement profile and authentication make a difference for nervous customers?

... **For a mobile workforce.** If there are ways that your business can profit from boosting the mobility of certain employees while ensuring that they have access to appropriate information, databases, etc., then add yourself to a burgeoning list of those who need to get ready for the wireless enterprise.

You'll need to consider how to take advantage of wireless data devices, how to keep control of their proliferation, what they'll cost, who they'll benefit. You'll also need to figure out which wireless solutions make sense for your organization and how to implement them—what's the impact on IT architecture, application development, security? And should you do it all in-house, or seek out a WISP or WASP to help out?

Get the answers you need at CTIA WIRELESS I.T. 2000.

If your website isn't wireless-ready, the cord isn't the only thing your customers will cut.



Today's web customers are at best a fickle bunch. Like most websites, you've spent millions of dollars and thousands of hours to create a solid business relationship with them. But if they can't get what they want from your website—in this instance, wireless access—they'll waste no time at all in taking their business to your nearest wireless-enabled competitor.

With wireless devices appearing at an alarming rate, this is one problem that isn't going away any time soon. But before you call your therapist, do something infinitely more productive: call Everypath.

With Everypath, your website can be quickly rendered (not stripped) into an optimal format that virtually any wireless device can work with.

Just like that, every wireless PDA, pager, and web phone (even regular voice telephones) will have total, seamless access to every part of your

website—including all of the crucial content, transaction, and commerce capabilities. All of which saves you from the unpleasant task of once again rallying your overworked web development team, guessing which wireless platform will be the most popular, and completely rebuilding your website to work with it. Not to mention spending money your budget wasn't ready for.

Instead, all you have to do is just make one phone call to Everypath. In a matter of weeks*, we'll have your website ready for anything and everything the emerging wireless world can throw at you.

To get the ball rolling, find us at www.everypath.com or give us a call at 1-888-711-8101 to speak with one of our representatives.

Because one way or another, your customers will be cutting the cord. Whether you and your website go with it is entirely up to you.



everypath

SHOW CO-HOSTS



Founded in 1984, CTIA is the voice of the wireless industry—representing its members in a constant dialogue with policy-makers in the executive branch, in the Federal Communications Commission, and in Congress. CTIA's industry committees provide leadership in the areas of taxation, roaming, safety, regulations, fraud and technology. CTIA distributes timely, factual and reliable information to members, policymakers, the investment community, customers and the news media on the latest policy and technical developments. CTIA coordinates the industry's efforts to be responsible and responsive to concerns about wireless health and product usage issues. CTIA operates an equipment testing and certification program to ensure high quality and reliability for consumers. CTIA runs an extensive anti-fraud program involving detection, prevention, investigation and research.

CTIA also is the parent of CIBERNET Corp., a subsidiary that administers the billing and financial accounting systems used by the industry to facilitate wireless roaming across the nation.

The Wireless Foundation, a non profit organization established by CTIA in 1993, initiates and oversees groundbreaking corporate philanthropy programs using wireless communications to make communities safer, families more secure and teachers more effective.



Wireless Data Forum

The Wireless Data Forum (WDF) is an independent, protocol-neutral trade group dedicated to promoting the wireless data industry. WDF's members include wireless operators and equipment providers, application developers and information technology companies working to advance wireless and mobile data products and services. The WDF sponsors marketing and outreach programs to educate the wireless and IT industries on the opportunities in wireless data and the scope and capabilities of wireless products and services. In addition, the WDF plays a cooperative role with other organizations promoting the development of standards and protocols for wireless data.

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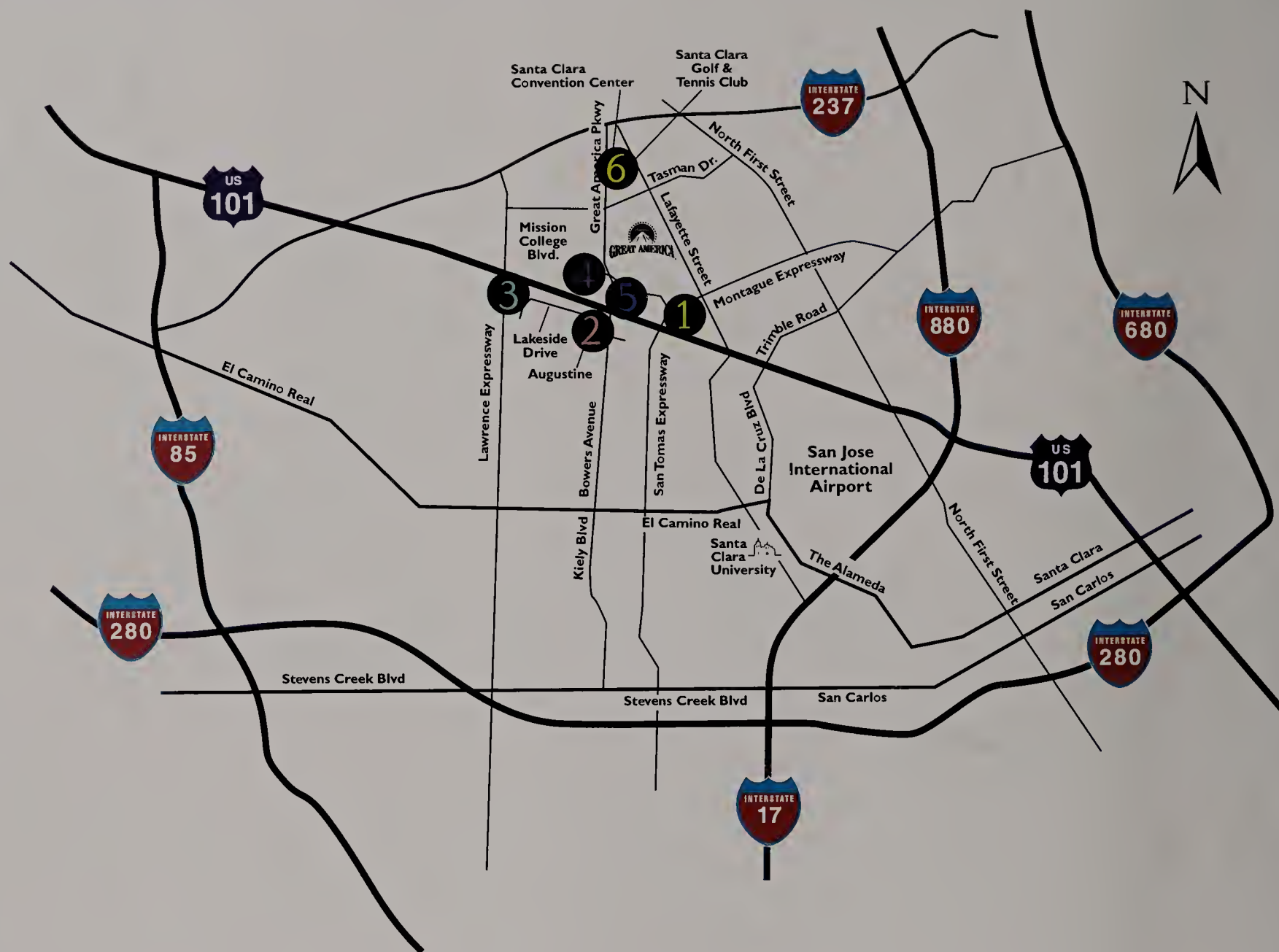
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\$149/\$149 Sg/DbI \$179 Tower Suite	3 Miles	1995	No	Yes	Suites Only	On-Site	Outdoor	1 Rest/2 Bars	Yes	Self Free	Yes	Yes

2 EMBASSY SUITES

2885 Lakeside Drive
Santa Clara, 95054
Rates: \$239 Single/\$259 Double

Rates Sg/DbI	Distance	Last Renovated	Concierge	Iron/BD	Fridge/Mini Bar	Health Club	Pool	Food/Bev	Rm Service	Valet/ Self Park	Hairdryer	Coffemaker
\$239/\$259	1 Mile	n/a	No	Yes	Yes	Yes	Indoor Heated/Sauna	1 Rest/1 Bar	Yes	Self Free	Yes	Yes

3 SHERATON SUNNYVALE

1250 Lakeside Drive
Sunnyvale, CA 94086
Rates: \$199 Single/\$199 Double

Four Points by Sheraton Sunnyvale was formerly the Hilton Sunnyvale

Rates Sg/DbI	Distance	Last Renovated	Concierge	Iron/BD	Fridge/Mini Bar	Health Club	Pool	Food/Bev	Rm Service	Valet/ Self Park	Hairdryer	Coffemaker
\$199/\$199	10 Minutes	N/A	No	Yes	Only in Suites	No	Outdoor	2 Rest	Yes	Self Free	Yes	Yes

4 HOLIDAY INN

4200 Great America Parkway
Santa Clara 95054
Rates: \$149 Single/\$149 Double

Rates Sg/DbI	Distance	Last Renovated	Concierge	Iron/BD	Fridge/Mini Bar	Health Club	Pool	Food/Bev	Rm Service	Valet/ Self Park	Hairdryer	Coffemaker
\$149/\$149	2 Blocks	1999	No	Yes	Suites Only	Cardio Room Only	Outdoor	2 Rest/1 Bar	No	Self Free	Yes	Yes

5 MARRIOTT SANTA CLARA

2700 Mission College Blvd.
Santa Clara, 95054
Rates: \$234 Single/\$234 Double

Rates Sg/DbI	Distance	Last Renovated	Concierge	Iron/BD	Fridge/Mini Bar	Health Club	Pool	Food/Bev	Rm Service	Valet/ Self Park	Hairdryer	Coffemaker
\$234/\$234	2 Blocks	2 Months Ago	Yes	Yes	No	Yes	Indoor/Outdoor	2 Rest/2 Bars	Yes, Until 1 a.m.	Overnight	Yes	Yes

6 **SOLD OUT** WESTIN SANTA CLARA

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Rates Sg/DbI	Distance	Last Renovated	Concierge	Iron/BD	Fridge/Mini Bar	Health Club	Pool	Food/Bev	Rm Service	Valet/ Self Park	Hairdryer	Coffemaker
\$249/\$259	Connected	1999	No	Yes	Yes	Yes	Outdoor	1 Rest/1 Bar	Yes	Self Free/\$10 Valet	Yes	Yes

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to go?

where are
you
now?



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wireless data network
providing mobile
access to the Internet.

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CTIA WIRELESS I.T. 2000

HOUSING FORM DEADLINE: 9/15/00

GENERAL INFORMATION

The site of the WIRELESS I.T. 2000 Convention and Exposition is the Santa Clara Convention Center located at 5001 Great American Parkway, Santa Clara, CA 95054, USA.

BADGE PICK-UP

Convention badges will be mailed to all non-international registrants whose forms are received by September 15, 2000. Badges for all registrations received after September 15, 2000, must be picked up at registration in the Main Lobby of the Santa Clara Convention Center in front of Exhibit Hall A beginning at 2:00 pm on October 15, 2000.

BADGE REPLACEMENTS

SUBSTITUTION POLICY:

There will be a \$25 service charge for replacing lost badges. Substitutions from the same company will be accepted if received by September 22. After September 22, substitutions requests must be on-site. There will be a \$25 charge for substitutions. Payment must accompany substitution requests.

HOUSING

For detailed hotel information (maps and amenities), please visit our website at www.wirelessIT.com

AIRLINE SAVINGS

CTIA has appointed Convention Management Center (CMR) as the Official Housing and Travel Coordinators for WIRELESS I.T. 2000. The WIRELESS I.T. 2000 Travel Desk will provide attendees with personalized, unbiased airline reservations and ticketing at the lowest available fare with one easy toll-free call.

American Airlines has been named the official airline for WIRELESS I.T. 2000.

Please call the WIRELESS I.T. 2000 Travel Desk at 800-334-6147 or call American Airlines direct at 800-433-1790 to take

THIS FORM IS FOR ATTENDEE HOUSING. YOU MUST COMPLETE THE FORM ON THE BACK COVER TO REGISTER FOR THE CONFERENCE.

- Attendee Housing forms are processed on a first-come, first-serve basis based on room availability.
- If you are an exhibitor, use the housing form enclosed in your Exhibitor Forms Packet.

Mail

WIRELESS I.T. 2000
c/o CMR
33 New Montgomery, 14th Floor
San Francisco, CA 94105, USA

Fax

+1-415-979-2250

Online

www.wirelessIT.com

Phone

800.334.6147

International + 1.415.979.2268

I. INFORMATION (Please print clearly)

Full Attendee Name (First, Middle Initial, Last)

Company/Organization

Address

City

State

Zip Code

Country

Phone

Fax

Email

2. HOUSING PREFERENCE

Room Type: ☐ Single ☐ Double

Arrival Date: _____ Departure Date: _____

Individual with whom you are sharing a room (if applicable)

- Rate in order of preference (#1- #6) next to hotel.

___ Biltmore \$149 single/double
\$179 Tower Suite
___ Embassy Suites \$239 single/double \$259
___ Holiday Inn \$149 single/double \$149
___ Marriott Santa Clara \$234 single/double \$234
___ Westin Santa Clara \$249 single/double \$259
___ Sheraton Sunnyvale \$199 single/double \$199

- Hotel guarantee amount will reflect hotel assigned.
- Hotel rates are subject to prevailing city room tax.

Special Requests

Special requests such as bed type, smoking or room views will be considered ONLY on an "as-available" basis. This information is then forwarded to the hotels for consideration.

☐ SUITE (If checked, CTIA will contact you)

advantage of the discounted fares for WIRELESS I.T. 2000 attendees. American Airlines telephone hours are 5:00 a.m. - 12 midnight (Central Time.) Please refer to file number A38HOAQ.

CAR RENTAL SAVINGS

Hertz has been appointed the official car rental company for WIRELESS I.T. 2000. Special discount rates are guaranteed and available from one week prior through one week after

the meeting dates. For reservations call Hertz at 800-654-2240 and refer to reference number 01PG0011.

3. DEPOSIT/GUARANTEE INFORMATION

No hotel reservation will be processed or confirmed without a check deposit or credit card guarantee in the amount of your first night's stay. All deposits will be non-refundable after September 15, 2000.

Please complete the following information.

☐ Check ☐ Master Card ☐ Visa ☐ AmEx

Card Number

Expiration Date

Signature (for charge)

Name and Organization as it appears on card

I authorize CTIA's WIRELESS I.T. 2000 Housing to charge my account for housing fees for the WIRELESS I.T. 2000, October 16-18, 2000.

- Please note that a small percentage of your room rate will go to CTIA to defray expenses of convention activities and shuttle bus service.
- Cancellation Policy: All deposits are non-refundable after Friday, September 15, 2000.
- You will receive hotel confirmation from CTIA's WIRELESS I.T. 2000 Housing desk within 5 working days of receipt of your completed housing form.

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To view the nominations on online go to www.unstrung.com or in print, see the latest issue of *Wireless Week*.

Voting begins September 6, 2000.

After the voting has ended, YOU the Industry will have spoken and only NINE new products will remain standing.



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Announced
September
25th**

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CTIA WIRELESS I.T. 2000

Santa Clara Convention Center Santa Clara, CA Silicon Valley Central

October 16-18, 2000

CONFERENCE PRE-REGISTRATION DUE: 9/22/00

• THIS FORM IS FOR ATTENDEE REGISTRATION, YOU MUST COMPLETE THE HOUSING FORM TO RESERVE HOUSING .

- Please complete one registration form for each person registering.
- Full payment must accompany this form to be processed.

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Fax this form to
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at 301-694-5124.

Mail

CTIA's WIRELESS I.T. 2000
P.O. Box 3918
Frederick, MD 21705
(1888 North Market Street 21701)

Phone

For questions, call
CTIA's WIRELESS I.T. 2000
at 301-694-5243.

Online

Logon to
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website at www.wirelessIT.com

I. BADGE INFORMATION (please print clearly)

Full Attendee Name (First, Middle Initial, Last)	Title	Company/Organization		
Address	City	State	Zip Code	Country
Phone	Fax	Email		

☐ Please check here if under the American Disabilities Act you require any auxiliary aids or services.

By registering for this event, you will automatically receive information on the wireless & wireless data industry and CTIA's free Daily News e-mail. Please check the appropriate box if you do NOT want to receive such information.

☐ Information on the wireless & wireless data industry ☐ The free CTIA Daily News e-mail

2. CONVENTION/EXPOSITION REGISTRATION

The Smart Pass—Best Value! Includes admission to exhibit floor, keynote sessions, all educational sessions, refreshment breaks, Exhibit Hall Preview Reception [10/16] and A.M. Oppenheimer Business Valuation & Sale of Business Seminar [10/16]. Check one.

☐ Before 9/1/00 ☐ After 9/1/00
Member/Non-member Member/Non-member
[M5] \$490/\$640 [N5] [M6] \$560/\$770 [N6]

Executive Passport Includes admission to exhibit floor, keynote sessions, all educational sessions, and refreshment breaks. Check one.

☐ Before 9/1/00 ☐ After 9/1/00
Member/Non-member Member/Non-member
[M1] \$330/ \$430 [N1] [M2] \$380/\$510 [N2]

Daily Rate—You must choose ONE of the days listed below. Includes admission to exhibit floor, keynote session, all panels and activities for that day. Check one.

Before 9/1/00 After 9/1/00
Member/Non-member Member/Non-member

☐ Monday October 16:
[E1] \$175/\$225 [E2] ☐ [E3] \$195/\$275 [E4]

☐ Tuesday October 17:
[E1] \$175/\$225 [E2] ☐ [E3] \$195/\$275 [E4]

☐ Wednesday October 18:
[E1] \$175/\$225 [E2] ☐ [E3] \$195/\$275 [E4]

Exhibits Package Includes admission to exhibit floor, keynote sessions and refreshment breaks—**October 17 and 18.**

☐ Before 9/1/00 ☐ After 9/1/00
Member/Non-member Member/Non-member
[M3] \$50/\$60 [N3] [M4] \$60/\$70 [N4]

3. SPECIAL INTEREST SEMINARS [SIS]

The below special interest seminars include admission to exhibit floor [10/17 & 10/18], keynote sessions and refreshment breaks.

☐ **A.M. Oppenheimer Business Valuation & Sale of Business Seminar—October 16** [P2] \$195

☐ **Ricochet Alliance Partner Conference—October 18 & 19**
Member/Non-member
[P3] \$249/\$399 [P4]

4. PAYMENT INFORMATION/FORM OF PAYMENT

☐ **Wireless Developers Seminar—October 15, 2000**
BONUS! New O'Reilly book: *WML/WAP—The Definitive Guide*, custom T-shirt, bound seminar notebook and CD-ROM. [P1] \$499

4. PAYMENT INFORMATION/FORM OF PAYMENT

If paying by check, please make registration checks payable to CTIA/WIRELESS I.T. 2000.

If paying by credit card, complete the following information.

☐ Check ☐ Master Card ☐ Visa ☐ American Express

\$_____ Convention Registration Amount

\$_____ Special Interest Seminars [SIS]

\$_____ Total Amount Due

Card Number Expiration Date

Signature (for charge)

Name and Organization as it appears on card

I authorize CTIA's WIRELESS I.T. 2000 Registration to charge my account for registration fees for the WIRELESS I.T. 2000, October 16-18, 2000.

Submission of this registration form confirms that I have read, understand, agree and will comply with the published Registration Cancellation Policy below.

5. POLICIES Cancellations, substitutions and request for refunds will not be accepted by telephone and must be submitted in writing for consideration. Cancellations and refunds will be considered only if submitted in writing no later than the deadlines below:

- Cancellations received by 9/1/00—Full Refund less \$50 fee.
- Cancellations received after 9/1/00 and prior to 9/22/00—50% refund.
- Cancellations received after 9/22/00—No refund.
- There will be a \$25 charge for replacing lost badges.
- Cancellations must be submitted in writing to WIRELESS I.T. 2000 Registration.

ATTENDEE PROFILE

What is your principal business?

[check only one]

- A. ☐ Applications/Software Developer
- B. ☐ ASP—Application Service Provider
- C. ☐ CLEC
- D. ☐ Consultant
- E. ☐ Content Provider/Aggregator
- F. ☐ Enterprise/Corporate/SOHO End-User
- G. ☐ Dealer/Retailer
- H. ☐ Distributor/Reseller/VAR
- I. ☐ Engineering
- J. ☐ Field Sales & Service
- K. ☐ Financial Services/Investment Banking/Venture Capital
- L. ☐ Fixed Wireless
- M. ☐ Healthcare
- N. ☐ ISP—Internet Service Provider
- O. ☐ LEC
- P. ☐ Manufacturer
- Q. ☐ OEM
- R. ☐ Systems Integration
- S. ☐ Transportation
- T. ☐ Utilities
- U. ☐ Vertical Market, Other: _____
- V. ☐ Wireless Portal
- W. ☐ Wireless Service Provider [Narrow/Broadband PCS, Cellular, CDPD, ESMR]

What is your purchasing involvement?

- A. ☐ Directly responsible
- B. ☐ Make recommendations
- C. ☐ No involvement

What is your title classification?

[check one]

- A. ☐ Executive [CEO, CTO, CIO, COO, Chairman, President etc.]
- B. ☐ Management [Director, Manager etc.]
- C. ☐ MIS/IT
- D. ☐ Engineering
- E. ☐ Sales/Marketing/Business Development/PR
- F. ☐ Administrative

What products or services are you interested in? [check up to five]

- A. ☐ 3G
- B. ☐ Accessories
- C. ☐ Antennas
- D. ☐ Batteries
- E. ☐ Billing/Accounting Systems
- F. ☐ Bluetooth
- G. ☐ Brokerage/Financial Services
- H. ☐ CDPD Applications
- I. ☐ Data Integration Services
- J. ☐ Engineering Services
- K. ☐ Enhanced Services
- L. ☐ Fixed Wireless/Broadband
- M. ☐ Handsets
- N. ☐ Insurance
- O. ☐ Location/Tracking Technology [GPS/GIS]
- P. ☐ Mcommerce
- Q. ☐ Networking Equipment
- R. ☐ Networking Software
- S. ☐ Power Supplies
- T. ☐ Security
- U. ☐ Test Equipment
- V. ☐ Voice Recognition
- W. ☐ Wireless Email
- X. ☐ Wireless Handhelds/PDAs
- Y. ☐ Wireless Information Services
- Z. ☐ Wireless Internet/Web Access
- AA. ☐ Wireless LAN/Desktop Access
- BB. ☐ Wireless Middleware
- CC. ☐ Wireless Data, Other: _____
- DD. ☐ Wireless Services



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A Difference OF Degree

Business schools are racing to keep up with the demand for e-commerce-specific education. Are they providing value or just leveraging the hype?

BY MEG MITCHELL

STAND NEXT TO ANY GRADUATE BUSINESS school these days, and you may hear some strange rumblings. Unless you're standing on a fault line, chances are the buildings themselves aren't coming down. The reverberations are less tangible than aftershocks, but they have far greater implications for the future of graduate business education and the greater business world. They are the sounds of e-commerce shaking business schools to their cores.

And business schools are responding. Some are offering e-commerce concentrations as part of MBAs. Others are eschewing this approach in favor of something more controversial—an actual master of science degree in e-commerce. But there's a lot of debate swirling around the best way to in-

Reader ROI

- ▶ Learn how e-commerce is changing business school offerings
- ▶ Find out the difference between master's degrees in e-commerce and MBAs
- ▶ Learn the types of jobs graduates with these new degrees are seeking



tegrate e-commerce into graduate schools, and it's not just academic. Both students and employers need to take a long, hard look at what's going into these degrees—and what benefits, if any, will emerge for companies desperate for e-commerce expertise. As graduate business education reshapes itself to the new economy, the sense of urgency may be diverting attention from the real question: Which programs are preparing its students to meet an electronic future? And the answer is important for both CIOs contemplating career moves and those in charge of hiring for their companies' online efforts who are left wondering what kind of education to seek in their applicants.

Many academic institutions are betting that e-commerce graduate training of various stripes will be just the thing to meet the sky-high demand for Web-conversant executives. But critics of the trend of separate e-commerce degree programs think universities are exploiting the popularity and coolness of e-commerce, when in fact what students really need is on-the-job

training or a basic grounding in business. According to Roy Moore, director of the Baccalaureate/Graduate Degree Commission of the Association of Collegiate Business Schools and Programs (ACBSP), an accreditation association for business education in Overland Park, Kan., schools are using the e-commerce hype to line their wallets rather than thinking carefully about what students need. "E-commerce is being blown up to be more than it is," he says.

Critics of the trend of separate e-commerce degree programs think universities are exploiting the popularity and coolness of e-commerce.

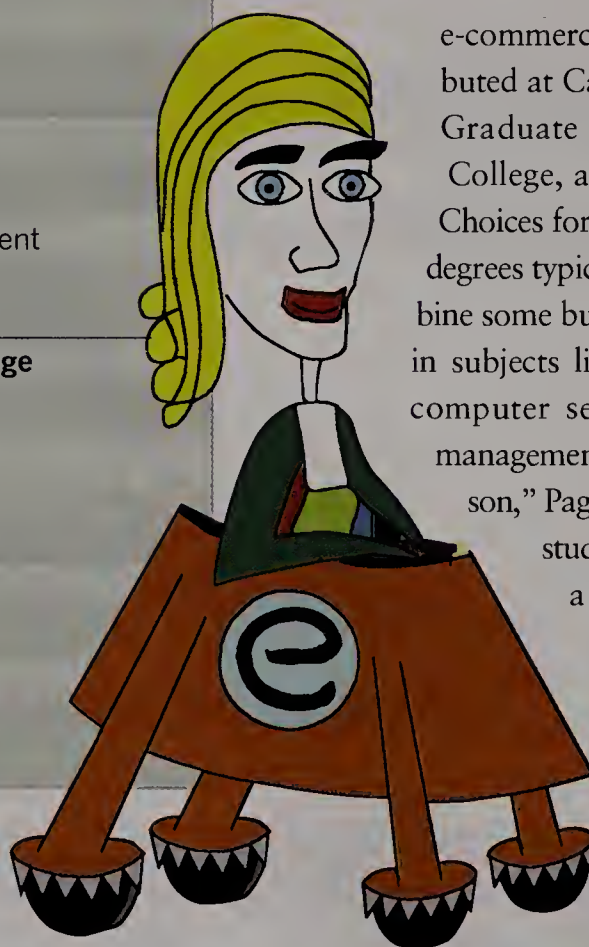
"I'm not sure it deserves a separate discipline. I see it more as a money-making gimmick." And he may have a point. After all, graduate schools are not educating students out of the goodness of their hearts. The more prospective students they attract, the more selective universities can be. And as the caliber of the students grows, so too does the attention of recruiters, raising a school's standing on those coveted best-of lists. So there's a lot of incentive for both schools and students to buy into the hype.

School Choice for E-Students

School	Carnegie Mellon
Location	Pittsburgh
Degree	Master's in e-commerce
First Class Graduated	May 2000
School	Marlboro College
Location	Marlboro, Vt.
Degree	Master's in Internet strategy management
First Class Graduated	December 1998
School	Boston University's Metropolitan College
Location	Boston
Degree	Master's in e-commerce
First Class Will Graduate	May 2001
School	Claremont Graduate University
Location	Claremont, Calif.
Degree	Master's in e-commerce
First Class Graduated	August 2000

I'll Take Mine with Extra E-Commerce

Despite the uncertainty, some schools have already inaugurated various forms of e-commerce education. Consider the MS in e-commerce, which has recently debuted at Carnegie Mellon, Claremont Graduate University and Marlboro College, among others (see "School Choices for E-Students," at left). These degrees typically run one year and combine some business courses with courses in subjects like database management, computer security and supply chain management (see "A Course Comparison," Page 124). The idea is that while students don't learn how to run a database or fix a network, they learn how to communicate with the people who can—the link between business and



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Humanity	1,000,000,000,000,000

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technology that has become a crucial part of doing business today. What makes Carnegie's program attractive is "the fact that it is focused on e-commerce—no extras," says Tridas Mukhopadhyay, the director of Carnegie Mellon's program in Pittsburgh. (Of course, that raises the question of whether the "extras" are actually necessities, producing the scary thought that students who choose one of these new master's over an MBA may be missing out on some crucial business education.)

But if these degrees are lighter on the business than an MBA is, they're certainly heavier on the technology—and technophobes need not apply. "Students should be prepared to come here and learn the technology," says Mukhopadhyay. "If they don't have the stomach for [the technology] they should opt for a general business degree." Mukhopadhyay notes that students in Carnegie's program typically come in with degrees in engineering, computer science or business, though some come from a liberal arts background and a few already have MBAs. They usually have an average of seven years of work experience in areas like Internet business development, consulting, MIS management and Web development, among others. And the first graduating class has found jobs with e-commerce, business development and project management consultancies and Internet startups.

At Marlboro College in Marlboro, Vt., the master's in Internet strategy management (ISM) emerged in 1998 after the small, ultra-liberal arts college created a graduate center to meet a growing need for programs for working professionals. "Our notion here was

that at the end of this program, people would have an understanding of what they would need to shape a company's Internet strategy," says Paul LeBlanc, the founder of the program and president of Marlboro College. "That's a question we get a lot: How are you different from an MBA? MBAs are great, but the reality is that there is a sense of urgency that drives our students." LeBlanc notes that one

student flies to Vermont every week from San Francisco because he can't find a similar program on the West Coast.

And if Marlboro's students' backgrounds are varied, so too are the jobs they take after completing the program. One 1998 ISM graduate was a nurse before entering the program; now she's the CIO for a network of hospitals in Vermont. Another graduate worked as an IBM mainframe software developer before the program and is now the director of Internet strategy for private banking company Brown Brothers Harriman. Still another was a former manager of a Mercedes Benz dealership and is now president of an Internet marketing consulting company that provides resources to online auto dealerships.

At Boston University's Metropolitan College, the master's degree in e-commerce,

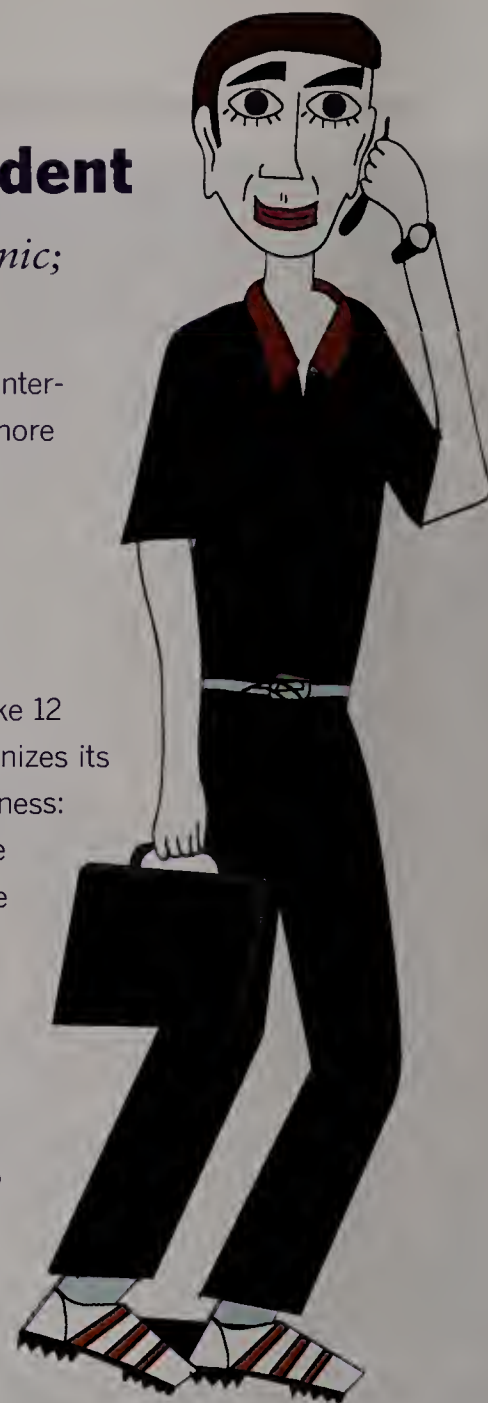
Go Global, Young Student

One program not only goes electronic; it goes worldwide

One might not think of Georgia as the center of international e-commerce—Silicon Valley seems far more suited to the role. But Georgia State, joining an international network of business schools from Denmark, Germany, Greece, the Netherlands and Norway, is set to offer the world's first global e-commerce master's degree.

The program, which will begin this fall, will take 12 months to complete. Each particular school organizes its own classes in the three general streams of business: technology, policy and law. Students attend three international seminars in person (locations rotate among participating universities) and then attend a combination of live classes and virtual courses over the Internet. In addition, they participate in virtual team exercises with their international counterparts. The goal is to attract managers, policy makers and entrepreneurs who will sandwich the classes in between full-time jobs. So it will be fairly rigorous. But think of the travel opportunities.

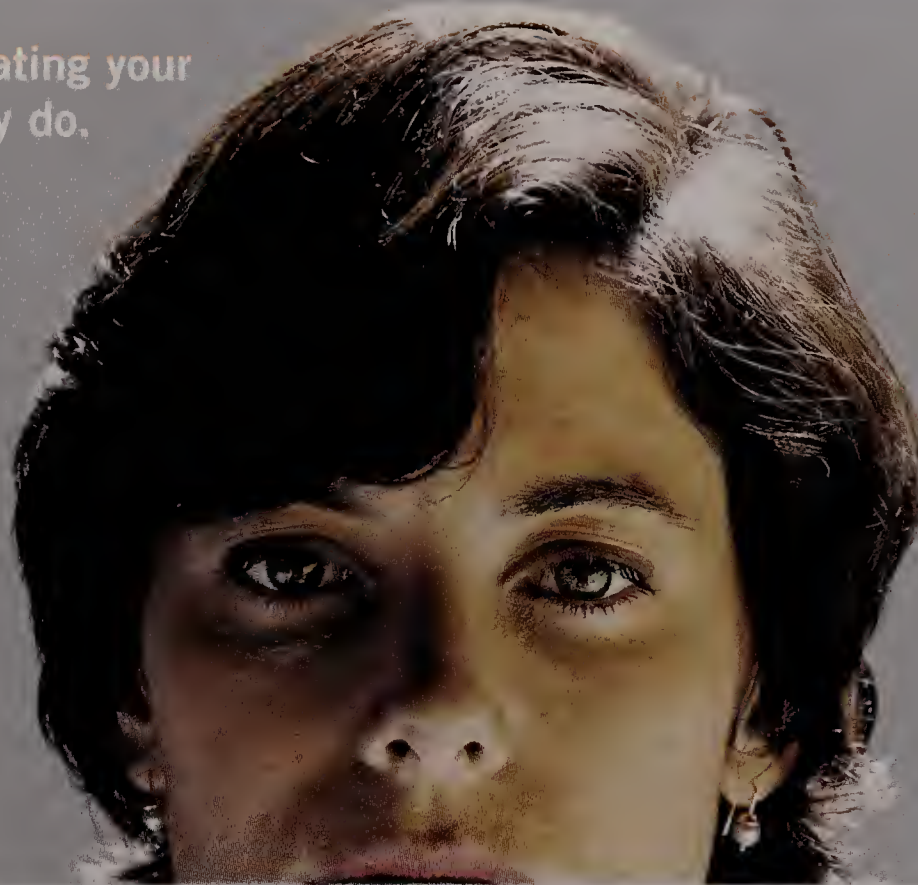
—M. Mitchell



“That’s a question we get a lot:
How are you different from
an MBA?”

—Paul LeBlanc, president of Marlboro College

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which launched January 2000, combines classes from BU's administrative sciences and computer science departments. The degree is geared toward both local working professionals and full-time international students. "We are probably attracting people who thought the MBA was not specialized enough," says Vijay Kanabar, the program's director, who points out that when the program debuted it attracted three times the number of students it could accommodate.

Why the popularity? Kanabar believes students are attracted to the thought of learning a good blend of computer science and management tips. He expects that students, who come from fields as varied as medicine (the current class includes two MDs), telecommunications and software, will take jobs as e-commerce security providers, designers, webmasters or analysts—jobs that require a certain amount of tech-

“Our clients would take a young talent with six months' worth of 18-hour days at a B2B startup company over a Harvard e-commerce graduate.”

—Dave Happe, president of Ecruiters.net,
an executive search company

nical proficiency mixed with business understanding. "Since the e-commerce program is offered jointly with the computer science department, students are technically smarter than the pure MBA student," he adds.

But in creating these programs, universities are facing some tricky questions, and potential students and employers must weigh the offerings accordingly: What, exactly, makes up e-commerce? Is it the technology behind selling on the Web or is it the business decisions behind the technology? A combination of the two? Does it include B2B, or is that a separate discipline? And can anyone really fit both business and technology into 12 months of study?

Keep It Integrated

Because the academic picture is still unclear, some educators doubt that dividing e-commerce from the rest of business education is the best way to train future new-economy leaders. While few schools dispute that e-commerce needs to become part of business school curriculums in some way—at a recent International Association for Management Education conference the panic emitting from deans and professors was nearly palpable—some think a more solid way to introduce e-commerce to these students is to serve it as a side dish, as part of

an MBA concentration, rather than as the main course. That might mean that those MBA students get the best of both worlds—a solid grounding in business and enough e-commerce to be able to speak the language of the new economy to those who do the technology work. Typically, students taking this approach spend two years in a program, take core courses in standard MBA fare, like financial accounting and statistical analysis, and then add courses in areas like channel management or electronic commerce management. (See "A Course Comparison," Page 124.) That is what's happening at the University of Pennsylvania's Wharton School of Business where a major in e-commerce is part of the MBA offerings. And at Michigan State University's Broad School of Business, the newly unveiled marketing technology MBA concentration combines classroom learning with input from an industry board that includes DaimlerChrysler, IBM and MVP.com. And at the University of Minnesota's Carlson School of Management, an e-business concentration will appear this fall as part of the MBA program.

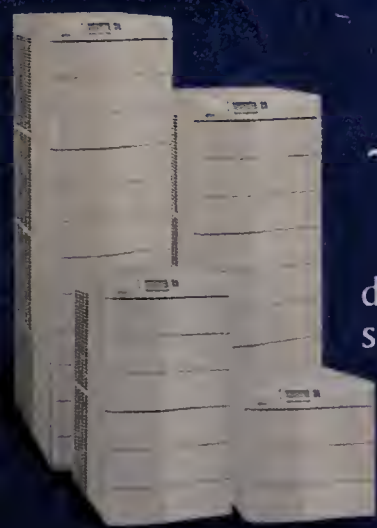
So Which Is Better?

With business schools performing makeovers faster than a stylist at Vidal Sasson, what's a business looking to hire some of





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these graduates to think? Academic insiders believe there is indeed a difference between students coming out with an MBA and those holding a focused e-commerce degree. Though these programs are still too new to categorize definitively, it's fair to say that the master's degrees in e-commerce attract students with more of a technology bent who have some interest in learning the business basics, while MBA degrees with e-commerce concentrations attract students who wish to dig deep into the business aspect and learn enough e-commerce tech-

will it be available?' Our response is, 'We have to integrate the learning better than we've ever done it before.'" And while he notes that the competition will become keen between Carlson's program and one like Carnegie's, Kaufmann doesn't think that people who seek high-level posts like heads of marketing can attain them without an MBA. "I think the lion's share of MBA recruiting will remain traditional," he adds, making the point that companies will still look for students with a deep grasp of business rather than the more shallow overview

Happe, president of Ecruiters.net in Chanhassen, Minn., an executive search company that specializes in Internet technology and e-commerce, thinks that these degrees aren't getting at the heart of what is needed today. "Our clients would take a young talent with six months' worth of 18-hour days at a B2B startup company over a Harvard e-commerce graduate," he says. "Ideas that led the industry a year ago now bankrupt companies that haven't changed several times since then." ACBSP's Moore adds that private schools may be jumping on the bandwagon quickly because their financial needs are more urgent than those of public institutions. At the same time, industry also wants universities to produce students ready to tackle e-commerce. Carnegie Mellon puts students to work on real-world problems furnished by the likes of the Texas Supreme Court and Diamond Technology. Sue Unger, CIO of Daimler-Chrysler, who serves on the industry board of MSU's marketing technology MBA concentration, is glad to see universities taking on the challenge of linking business degrees with e-commerce: "Businesses have a responsibility to help any university shape what they need." But she emphasizes that a comprehensive understanding of business is important, which may bode badly for the focused e-commerce degrees. "If you do anything with 100 percent focus there's a danger the technology is going to change."

There's a chance for schools heavy into e-commerce to produce dotcom millionaires, who then look kindly on the schools that got them where they are.

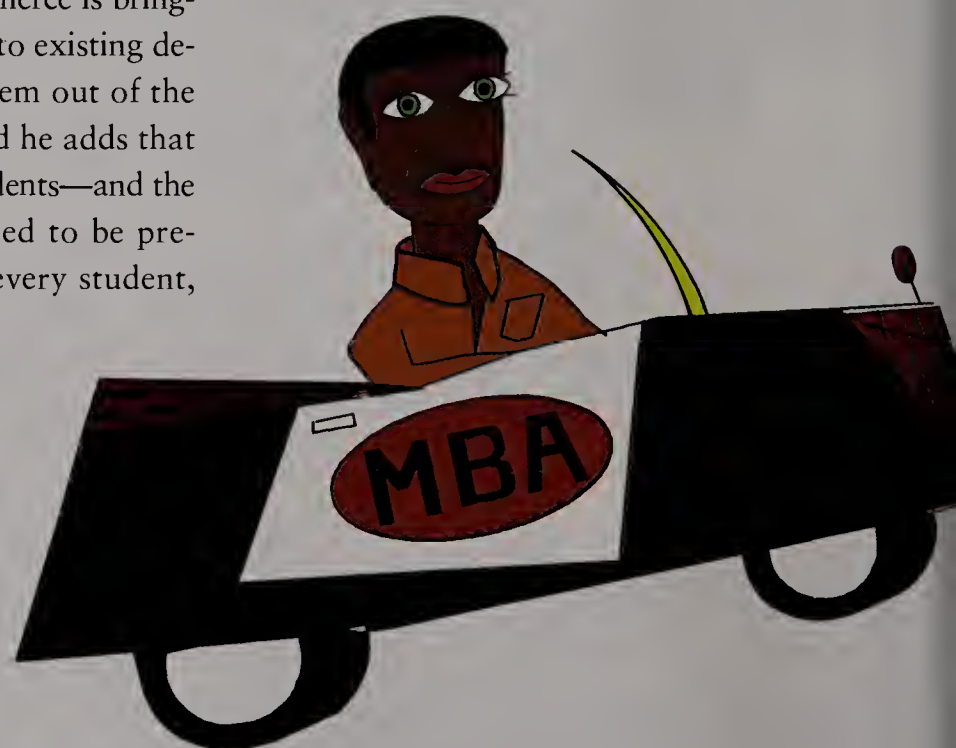
nology to give those business lessons some context. Dave Schmittlein, deputy dean at Wharton, sees different goals in the two types of degrees. "It's not that we think that [the e-commerce degree] is a wrong path to take," he concedes. "But I think some of the MEB [master's in electronic business] programs are training people to play a role in midlevel staff positions at an eBay or an Amazon.com or for smaller companies looking for help managing e-business." In elite MBA programs like Wharton's, he says, there's more chance for entrepreneurs to thrive, faster access to venture capital and more of an opportunity to put together comprehensive business plans because the program's focus is on hard-core business lessons while still incorporating e-commerce.

Rob Kaufmann, an associate professor at Minnesota's Carlson, worries that some schools are jumping in too quickly without figuring out how these new degrees fit into their overall offerings: "Students ask, 'When

that e-commerce master's degrees offer.

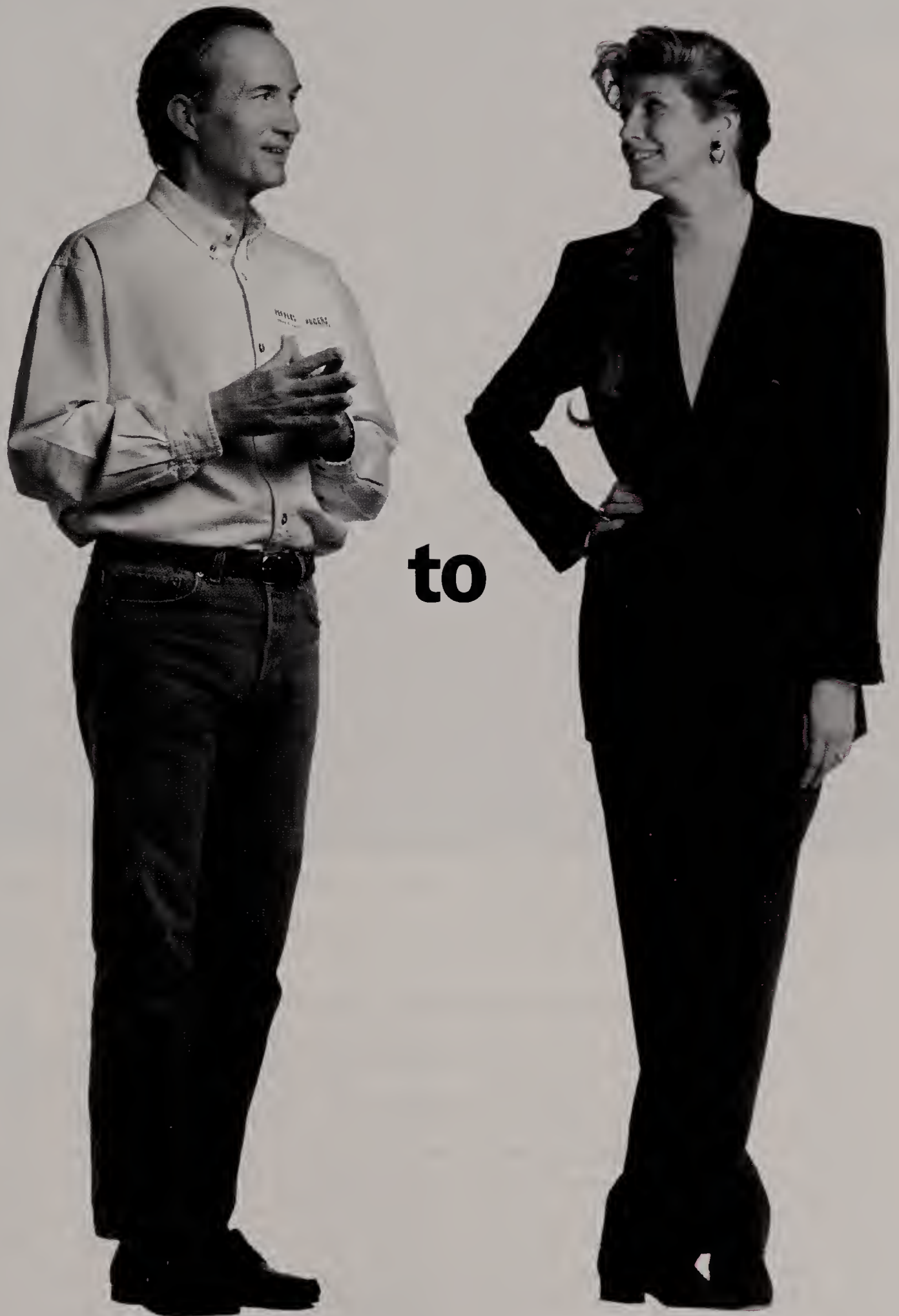
Robert Nason, chairman of the department of marketing and supply chain management at Michigan State University's Eli Broad Graduate School of Management, speaks more bluntly of the emergence of e-commerce courses: "We believe those are fad programs." The best programs, he says, integrate the changes e-commerce is bringing to the business world into existing degrees rather than slicing them out of the wider business context. And he adds that even in MBA programs, students—and the people who hire them—need to be prepared for changes. "I tell every student, 'What I tell you now may not be what we offer you next year.'"

Outside academe, where many are highly skeptical of the e-commerce degree trend, the arguments take a different shape. Dave



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to



But Carnegie Mellon, which has long enjoyed a stellar reputation in both business and technology, defends its MS in e-commerce. "I don't want to give the impression that the MBA is not a good degree. It's a very good degree. But our people have an advantage when it comes to e-commerce. What they learn is not possible in an MBA program," says Carnegie's Mukhopadhyay, referring to the intense focus on e-commerce and the hands-on experience students get in industry projects. And there's something to be said for the length of the program—with the business world changing rapidly, students who spend less time away from the real world may realize an advantage over those who devote two years to school.

At Claremont Graduate University, Lorne Olfman, dean of the school of information sciences, is unabashed about the program's focus on e-commerce. "I think people think this is where the jobs are going to be," he says. "The biggest challenge is packing what people need into the number of units they're going to pay for." But interestingly enough, Blake Fitch, a student in the BU program who is developing a site with other students in her program to sell original artwork and photography online, thinks she will go back and get an MBA eventually, even after she has her master's in e-commerce in hand. Why? "In my heart of hearts I feel like the job placement is just better [with an MBA]," she admits.

Ravi Tripuraneni, a student in Claremont's program, already has a PhD in marketing and an MBA under his belt. But he still felt a void—"This whole industry is too huge to miss," he says—so he signed up for Claremont's master's program. However, while non-MBA students coming into the program do get some sort of grounding in business basics, he notes that his classmates with MBAs have a firmer grasp of implementation and strategy development than those without.

Whether or not these degrees serve Tripuraneni and others like him forever, they're still attracting plenty of positive attention. "I

think for at least the next several years this will be worth a lot to people who have the right set of core skills," asserts Tripuraneni, who plans to go into e-commerce consulting or startup strategy development when he completes his degree. Claremont's Olfman voices little concern about the degree's potential for survival. "If the demand goes away we won't offer the degree anymore," he says.

The Future Looks... Well, Uncertain

Just to complicate matters, Boston University's graduate school also offers a dual IS-MBA degree with an emphasis on e-business, and Temple University's Fox School of Business is set to offer one this fall. Others are sure to follow. Maybe these schools have the right idea. But changing a university's curriculum is never an easy task, and universities are not known for their agility. And now that schools are ready to try to keep pace with business, they face hurdles in faculty, budget approval and time. Temple University began marketing its dual-degree program before it had fully gained approval from the university board. If it hadn't, the

university would have lost students—and their money—to other schools implementing similar programs faster. And that brings up another point. Even with high-tech stocks misbehaving on Wall Street, there's a chance for schools heavy into e-commerce to produce dotcom millionaires, who then look kindly on the schools that got them where they are. You get the picture.

But no matter how many times universities put "E" in front of their programs or concentrations, the fact remains that the basic tenets of business aren't going anywhere anytime soon. To be successful, companies still have to turn a profit (that means you, too, dotcoms), acquire new customers, manage growth and keep up with changing times. For each type of student—and for each type of employer—the needs and expectations from business degree programs may vary. Educators and students agree that this is a year of enormous upheaval in graduate business education. Anyone involved had better hang on tight. It's going to be quite a ride. **CIO**

Senior Writer Meg Mitchell, whose graduate degree is in the tremendously useful field of English literature, wants to know what you think about e-commerce degrees. Let her know at mmitchell@cio.com.

A Course Comparison

Carnegie Mellon
Master's in e-commerce
One-year program consists
of six mini-semesters

Sample Courses

E-Commerce Technology
Communications and Networking
Information Retrieval
Internet Marketing
Human-Computer Interaction
E-Commerce Law and Regulation

Temple University's
Fox School of Business
Combined MBA/master's in e-business
Two-year program

Sample Courses

Entrepreneurship and Innovation
Law and Ethics in Business
Information Architecture and Networking
Database Analysis and Design
Electronic Relationships and Virtual Organizations

For sample curriculum from Wharton's MBA with major in managing electronic commerce, see www.wharton.upenn.edu/mba/curriculum/ecom.html.

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If San Diego succeeds in becoming the next local government to pull off a multiyear, megamillion-dollar outsourcing arrangement, it'll also be the first

HIGH ANXIETY

BY TOM FIELD

Reader ROI

Find out why one U.S. county believes it can succeed in a major governmental IT outsourcing initiative where others have failed
Learn how a collaborative group of vendors aims to handle this massive IT revamping

IT'S MAY DAY 2000, AND THE COUNTY OF SAN DIEGO IS JUST SIX MONTHS into its landmark, full-scale IT outsourcing contract with the Pennant Alliance, a four-vendor partnership led by Los Angeles-based Computer Sciences Corp. (CSC). It's the beginning of the end of the deal's 180-day transition period, and the eyes of the outsourcing world are watching. But frankly, some of the early sights are scary. ■ Staffing is down. Before the seven-year, \$644 million pact was approved by the county's board



**Shadows of Doubt: San Diego
County CTO Tom Boardman**

*"must keep things from
getting out of proportion."*

I.S. Outsourcing

of Supervisors on Oct. 26, 1999, the county had 350 employees and 100 contractors providing IT services. When the deal was done, the county expected that about 275 IT employees included within the deal's scope would pick up tools and transfer. But instead, only 220 made the move. Of those left, 42 employees quit early in the outsourcing discussion, 25 transferred to other county jobs, and 63 took advantage of a severance/retirement package that gave employees 20 percent of their annual salary or credit for two additional years of service toward retirement. The contractors all found work elsewhere—some of them with the Pennant Alliance partners. But this instant staffing shortage left the Alliance in the position of hiring

e-government. Outside California, where no state or county has ever outsourced technology on this scale (to learn what became of Connecticut, the last state to try, see "Between a Rock and a Hard Place," Page 124), IT executives and vendors nationwide have pegged San Diego County as the beta site for whether the regional government marketplace is a potential boom or bust.

"Typically, there are problems at the start [of an outsourcing engagement] during implementation," says Peter Bendor-Samuel, president of the Everest Group, a Dallas-based outsourcing consultancy, which has no stake in the San Diego deal. To get over the hump, he says, the Pennant Alliance must throw all available resources at the

problem, and the county must continue to hold the vendors' feet to the fire—and not just to meet the contracted service levels. "If [Pennant doesn't] turn things around," Bendor-Samuel says, "then [the county and vendors] are going to be in a world of hurt."

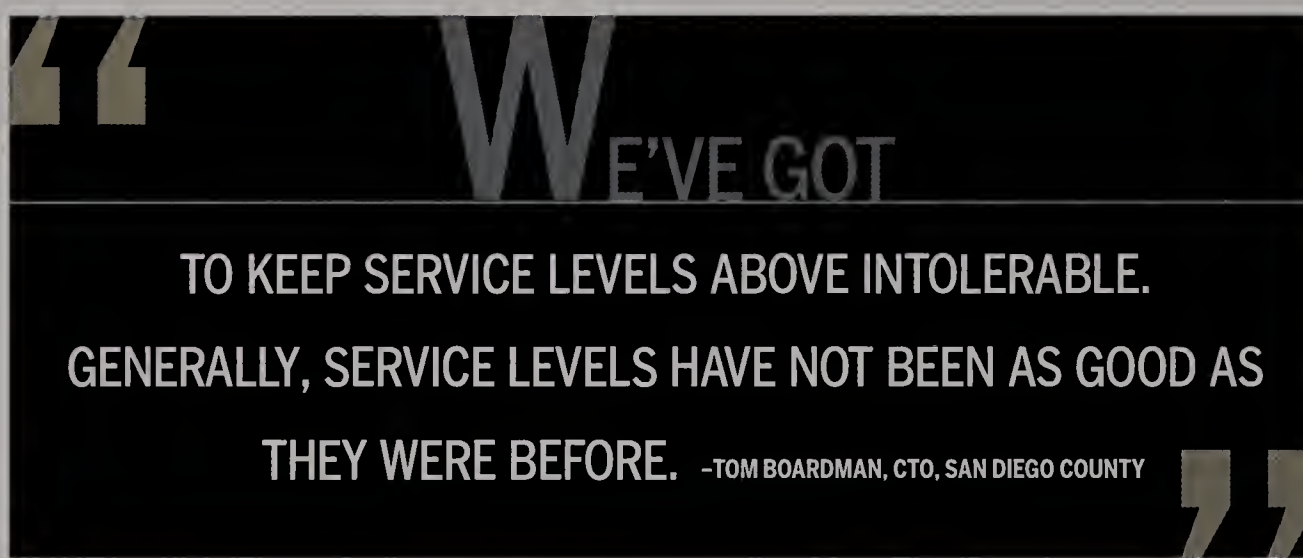
THE STAKES

TRYING TO MITIGATE THE HURT FOR SAN DIEGO IS TOM BOARDMAN, the county's new CTO. "My job is to keep things from getting out of proportion," says Boardman, who

was hired in August 1999, two months prior to the deal's approval. Formerly the director of applications development at AAA of Northern California, Boardman also used to work for MCI/Systemhouse, which was acquired by EDS. He has significant outsourcing experience; that's why he was hired to manage the contract in place of former San Diego CIO Graham Lynch, a longtime county employee who opted for early retirement when the deal was struck, then accepted a non-county position with Pennant vendor SAIC. "We've got to keep service levels above intolerable," Boardman says, aiming low. "Generally, service levels have not been as good as they were before [outsourcing], but they've not been below tolerable. The question we always ask is, 'Were we in the paper?,' and so far we haven't been."

Richard Jennings, the CSC vice president who heads the Pennant Alliance, knows what's at stake: "This is one of the most aggressive outsourcing engagements we've ever taken on." A longtime CSC executive who serves as vice president and general manager of the company's entire western region, Jennings appreciates the potential rewards of this deal. "We're very interested in the state and local government marketplace," he says. "We think it's going to be big." But Jennings also appreciates the risk, which he sums up quickly and coolly as, "having one of the most public outsourcing contracts fail."

Boardman has 20 senior managers and 10 project managers countywide overseeing the contract, which spells out 101 different



roughly 100 replacement workers unfamiliar with the county and its antiquated systems. With this higher-than-expected turnover came a huge loss of institutional knowledge.

Service levels have dipped. County and Pennant executives expected system support and response times to slip during the transition, then pick up quickly. But voice, WAN and video system uptimes remain poor—well below the 99.8 percent uptime stipulated in the contract. In fact, they're below pre-outsourcing levels.

Culture shock abounds on both sides of the county and Alliance partnership. Consider the county perspective: Suddenly, employees from throughout the county's dozens of agencies have to formally request and *pay* for IT assistance they used to get for free. And then consider the Pennant Alliance partners—CSC, Lucent Technologies, Pacific Bell and SAIC—which are used to conducting their business in relative privacy (see "The Players," Page 120). Now every term of their multivolume contract is open for public inspection, and every misstep is a potential newspaper headline.

Make no mistake, there's a great deal of public interest in this project. It's not just another full-scale, soup-to-nuts outsourcing agreement. It's the biggest, broadest IT privatization pact ever entered into by a U.S. state or local government. Within the county's 4,261 acres, elected officials, agency employees and citizens have a vested interest in seeing whether outsourcing will transform San Diego County from a legacy-laden IT laggard to an efficient, effective

**"THIS IS ONE OF THE MOST AGGRESSIVE OUTSOURCING
ENGAGEMENTS WE'VE EVER TAKEN ON."**

-RICHARD JENNINGS, VICE PRESIDENT, CSC



service levels (for example, Pennant Alliance has four hours to fix and repair a broken PC once it's reported), 44 of which have financial penalties if they're not met. The maximum penalty is \$675,000 per month—"enough to get anybody's attention," Boardman says. The contract also has built-in checkpoints so that the county and Pennant Alliance alike can review and renew the contract at the end of each year or opt out (with penalties) if the deal looks undoable.

These first six months have been the honeymoon; no one expected any revolutionary changes during the transition period. But the next six will be the test of the marriage. No more transitional excuses.

SAN DIEGO'S VISION

San Diego County has a three-phase vision for how its deal with Pennant *should* work.

Phase 1. By December 2000, replace the IT infrastructure, including telephones, desktop PCs, data network and disparate software applications. Implement the first countywide e-mail and voice-mail systems.

Phase 2. During Year 2, replace outdated administrative systems with two new ERP applications (PeopleSoft for HR, Oracle for finance), with the goal of creating a single data entry point for infor-

I.S. Outsourcing

mation that can be shared across all county agencies.

Phase 3. By Year 3, provide an Internet delivery channel for county services. Currently, the county does offer some online permit issuing, property tax payment and park reservations, but the plan is to put every possible county service online.

Now is when systems must be replaced, software standardized and two new ERP systems rolled out to improve financial and personnel processes. By mid-December 2000, the end of the contract's first year, San Diego County, the Pennant Alliance and all observers will have a good sense of where this deal is headed. If service levels improve and milestones are met, then everybody will be happy. If things don't get better, then it'll likely be the beginning of the end—a messy, public divorce that will shortchange the county, embarrass the vendors and potentially put a stake in the heart of the local government outsourcing marketplace. Boardman, for one, isn't worried. "I lose no sleep over whether this [deal] will fail," he says. "This is not going to fail."

FROM HERE TO THERE

TO APPRECIATE THE SCOPE OF THIS WORK, UNDERSTAND THE COUNTY'S starting point. When Boardman was hired, he inherited a 15-year-old phone system that suffered frequent outages; a ragtag army of 286 and 386 PCs that ran on 15-year-old legacy applications (some bought, some built—none standardized); a patched-together LAN that

had been developed incrementally over time; and a veteran staff with little experience in leading-edge technologies. "We had basically main-frame people," Boardman says. "Our systems were written in the '70s and '80s and maintained by the people who created them."

The county Board of Supervisors was willing to spend money to update these antiquated systems, but not the estimated \$250 million it would have cost for a total IT makeover. As for staff, the county faced the classic government challenge: How do we compete with private industry? "Our salaries were 20 percent to 30 percent below the marketplace, and there was really no hope of getting better," Boardman says. "We were treading water very well, but treading water doesn't help an aging system or infrastructure."

Outsourcing was first discussed in 1996, when the county was entangled with bad debt similar to that which bankrupted Orange County. To get out of the hole, the county recruited a new chief administrative officer (CAO), Larry Prior, from TRW, the Cleveland-based global IT company. Prior believed in privatization. He initiated a managed competition program in which county agencies would compete with private industry for the right to perform certain public services. Prior's first target was the county's trash collection system, which was privatized in 1997 for \$180 million, saving the county roughly \$56 million, or enough to help balance the books. Soon after, Prior hired TRW colleague Helen Robbins-Meyer, who is currently the

county's assistant CAO, to head a managed competition committee to seek out other privatization targets. That group quickly realized that IT was a great outsourcing candidate.

"We were looking at a future that did not have a technology base to sustain it," says Robbins-Meyer. "What kind of IT expert wanted to come work for the county? What was the career potential, the earning potential? We had some of the best [IT employees], but not 500 of the best."

In November 1998, Robbins-Meyer's team secured the Board of Supervisors' permission to study IT outsourcing. The group then retained the services of the Warner Group consultancy and Gordon & Glickson, a Chicago-based law firm that specializes in outsourcing. County officials knew where they wanted to go; the consultants knew how they could get there. Problem was, no state or county government had ever pulled off such an ambitious outsourcing plan. There had been attempts—Connecticut's being the most recent try—but they all fell victim to politics or labor unions.

But San Diego County was different from Connecticut in several key ways—at least, that's what Prior and Robbins-Meyer believed. In

THE PLAYERS

CSC AND SAIC CALL THE SHOTS IN FOUR-VENDOR PENNANT ALLIANCE

Computer Sciences Corp. (CSC) is the lead dog in San Diego County's seven-year, \$644 million IT outsourcing contract. But the Pennant Alliance, the CSC-led team that won the job, is actually a four-vendor partnership. Here are the players:

CSC (www.csc.com): Based in Los Angeles, CSC is a full-service outsourcing vendor with more than 700 offices and 54,000 employees worldwide. CSC had revenues of \$8.2 billion in 1999. CSC is the co-owner and contract manager of the Pennant Alliance.

SAIC (www.saic.com): San Diego-based SAIC is the largest employee-owned research and engineering company in the United States. With annual revenues of \$4.7 billion, SAIC has more than 38,000 employees in 150 global offices. SAIC provides technology products and systems integration services to many commercial and government customers. SAIC co-owns the Pennant Alliance.

Pacific Bell (www.sbc.com): A subsidiary of Texas-based SBC Communications, PacBell is San Diego County's third-largest employer (more than 5,500 local employees) and offers a variety of telephone, wireless and Internet services. PacBell is a Pennant Alliance subcontractor brought in for its telecommunications expertise.

Lucent Technologies (www.lucent.com): Spun off from AT&T, Murray Hill, N.J.-based Lucent builds and integrates a wide range of public and private data networks. Supported by Bell Labs, its R&D arm, Lucent is a Pennant Alliance subcontractor brought in for its networking expertise. —T. Field

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Connecticut, the Democrat-controlled legislature opposed the Republican governor and his handpicked CIO at every turn. In San Diego, the county's five-member, nonpartisan Board of Supervisors was behind the outsourcing concept from the start. And, unlike Connecticut, where virtually all of the IT employees belonged to unions that opposed outsourcing on principle, only about 40 of the county's 500 IT employees belonged to the Service Employees International Union (SEIU).

The biggest hurdle Robbins-Meyer's team had to overcome was the skepticism of the various county agencies—Community Services, Health and Human Services, and dozens of others—whose employ-

ees didn't understand how paying an external supplier for IT services could ever result in cost savings. Mary Grillo, executive director of SEIU Local 2028, told *The San Diego Union-Tribune* last fall that she believed the Pennant proposal was too large and too risky. "We are the guinea pigs on this type of project, and everybody freely admits nothing has been done on this scale before," Grillo told the newspaper. "The county hasn't been able to effectively monitor its contracts thus far, and we don't believe it will be able to handle a project of this scope."

The key to securing the agencies' support was to sell outsourcing

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by promising improved service to the agencies. To gain public support, the county brought its case to the San Diego County Taxpayers Association, a politically influential group with 1,800 members. Taxpayers generally support privatization efforts, believing they cut costs and reduce the public payroll. But because a deal like this had never been done before, citizens had every reason to be suspicious of this plan. "There was no constituency out there saying, 'You should outsource IT,'" says Scott Barnett, executive director of the association.

"Most people don't even know what IT is; they just care about the level of services they receive." Upon reviewing the county's plan and decision-making process, the taxpayers association endorsed outsourcing as a risk worth taking. "I feel fairly confident that what they're doing will be better than the old system and that the taxpayers will get better quality of services," Barnett says. Certainly, his group is concerned about the initial service-level dips, but Barnett still supports the outsourcing initiative. "We'll be waiting to see if [services] improve as expected."

BETWEEN A ROCK AND A HARD PLACE

A YEAR AFTER HIS OUTSOURCING DEAL FELL FLAT, CONNECTICUT'S CIO IS REBUILDING THE STATE'S I.T. ORGANIZATION

A year ago, Rock Regan hit rock bottom. June 28, 1999, is the day Regan, Connecticut's CIO, abandoned his three-year effort to outsource the state's IT investment. There are a lot of reasons why outsourcing failed—too much labor opposition, not enough legislative support, residual bad feeling after the state won and then lost the NFL's New England Patriots. And in the end, Regan simply couldn't strike an equitable contract with EDS. Regan thought then, on a recuperative vacation after the ordeal, that his days were numbered.

Today Regan sits in a new high-rise office, presiding over a rebuilt, revitalized IT organization that strives to achieve everything that outsourcing was supposed to bring. He's got more staff, more money than he had a year ago, and he's starting to believe that, more than a checkered past, he actually has a future as the state's CIO. He even advised San Diego County on its outsourcing decision, warning county leaders to stay vigilant. "Don't hand over the keys and walk away," Regan counseled. "I'm not down on outsourcing; I think it can work—it does work. But it needs help from all sides to be successful."

Reflecting on his experience, Regan says, "It was never about outsourcing. The goal wasn't to outsource but rather to achieve our core objective—to improve public service."

The same old problems remained when Regan returned from his post-outsourcing vacation. The state's outdated systems still

needed replacing, the old-school staff needed new skill sets, and the central IT group needed to get out of its dilapidated downtown headquarters. What changed was Regan's approach to these problems.

First, Regan dealt with his facilities and staffing issues. He asked legislature for a new building, 30 new staffers and direct report-



Outsourcing can work,
says Connecticut
CIO Rock Regan.

ing relationships with the 58 IT managers throughout the state agencies. Surprisingly, the legislature said yes—a shock to Regan, who was accustomed to hearing no. "It was nice for a change to not be grilled for five hours," says Regan.

Properly funded, Regan set about securing a new headquarters, a high-rise building in East Hartford that used to house the local branch of FDIC. Next, Regan reorganized his staff, centralizing all state IT services around his core executive manage-

ment group. In addition to the 58 IT managers who joined Regan's group on July 1, next year he is taking over management of an additional 300 IT workers, giving him control of a central IT group numbering around 600. With this bigger, buffer central IT group, Regan is changing the service delivery model to look more like a vendor now, writing and meeting service-level agreements with each of the state agencies.

The state's Y2K remediation replaced much of the outdated technology infrastructure, but Regan still has a skills gap. To deal with this, he's budgeted for more staff training, and he's even bringing in a few consultants to provide new skills. But even when dealing with the vendors, the goal is to transfer those skill sets to state IT workers so that all external relationships are temporary.

Looking back, Regan says his biggest mistake was underestimating the opposition. "We had battles on every front—the unions, the employees, the legislature—and we just didn't have time to spend fighting those battles," Regan says. His second biggest mistake was misunderstanding the shades of differences between such vendor-speak words as *commitment*, *promise* and *goal*. (Hint: Commitments come with penalties, goals don't.)

No doubt, when outsourcing history is written, Connecticut will appear among the early failures, but Regan rejects the "loser" label. "It's only a failure if we fail to do anything to resolve our problems," Regan says. "We're showing progress." —T. Field

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A CROWDED FIELD

THE PENNANT ALLIANCE WASN'T THE ONLY VENDOR PARTNERSHIP TO bid for the San Diego County job. IBM and EDS also fielded impressive teams. And at first, the CSC-led Pennant team didn't stand out among its competitors. "All three vendors could do the job," says Lana Willingham, the deputy CAO who helped negotiate the contract with Pennant. "In the end, the Pennant Alliance seemed to want [the job] the most. They were more flexible in coming to terms [that is, willing to commit to tougher service-level agreements], and they also were able to create a good understanding of the path for us to move to e-government."

When the board gave the OK for signing a contract with the Pennant Alliance, opposition turned to outrage from employees who wanted nothing to do with being outsourced. "We had people who were used to county government and dedicated to public service," Robbins-Meyer says. "They were not interested in making some big company richer."

Boardman joined the county on Aug. 28, 1999, the day after the county selected the Pennant Alliance. He recalls vividly the anger directed

three people testified against the plan. "Since then there have been no lawsuits, no sabotage," Boardman says.

PROGRESS REPORT

DESPITE THE SETBACKS, THE PENNANT ALLIANCE HAS MET SOME SIGNIFICANT milestones. As of July 1, more than 2,000 new state-of-the-art PCs have been rolled out, and more than 1,000 phones have been replaced in four locations. The county's Internet communication speed has been increased 140-fold. An assessment of the county's 533 applications has been completed, and data hub tools have been installed to allow Web applications to access data from core applications. A county-wide information security assessment has been completed, and major security vulnerabilities have been corrected. A release strategy for the new ERP systems has been developed, and 22 different help desks have been consolidated into one.

Still, the glitches haven't gone unnoticed by this contract's biggest critics. "This deal has pretty much been living up to our expectations,"

says the SEIU's Grillo. "It hasn't been smooth sailing at all." The former county workers who transitioned to Pennant Alliance employment have been treated well, Grillo says—all of her former union members now belong to a machinists union within CSC—but she's concerned about how the transitional setbacks are affecting the county's ability to function. "We think [outsourcing] is actually making employees less productive at this point," she says. And if so, then that productivity loss only adds to the union's argument against

outsourcing. "We've thought all along that this deal would end up costing the county a lot more than anyone initially thought," Grillo says.

No question, the Pennant Alliance must deliver. Now. Systems must be replaced, service levels must be met, and county employees and citizens must start seeing some of these new e-government services they've heard about for so long.

On the outside looking in, outsourcing consultant Bendor-Samuel is rooting for success. "This deal has tremendous ability to bring value to government," he says. "If it works, it will work for the people of San Diego County, for the government and for the vendor. It could be a huge win-win-win." But he also knows that if the partners can't ease out of this transition period and start delivering on their promises, then they run the risk of losing all credibility with county employees and citizens alike. If that happens, Bendor-Samuel says, "Someone will get strung up." **CIO**



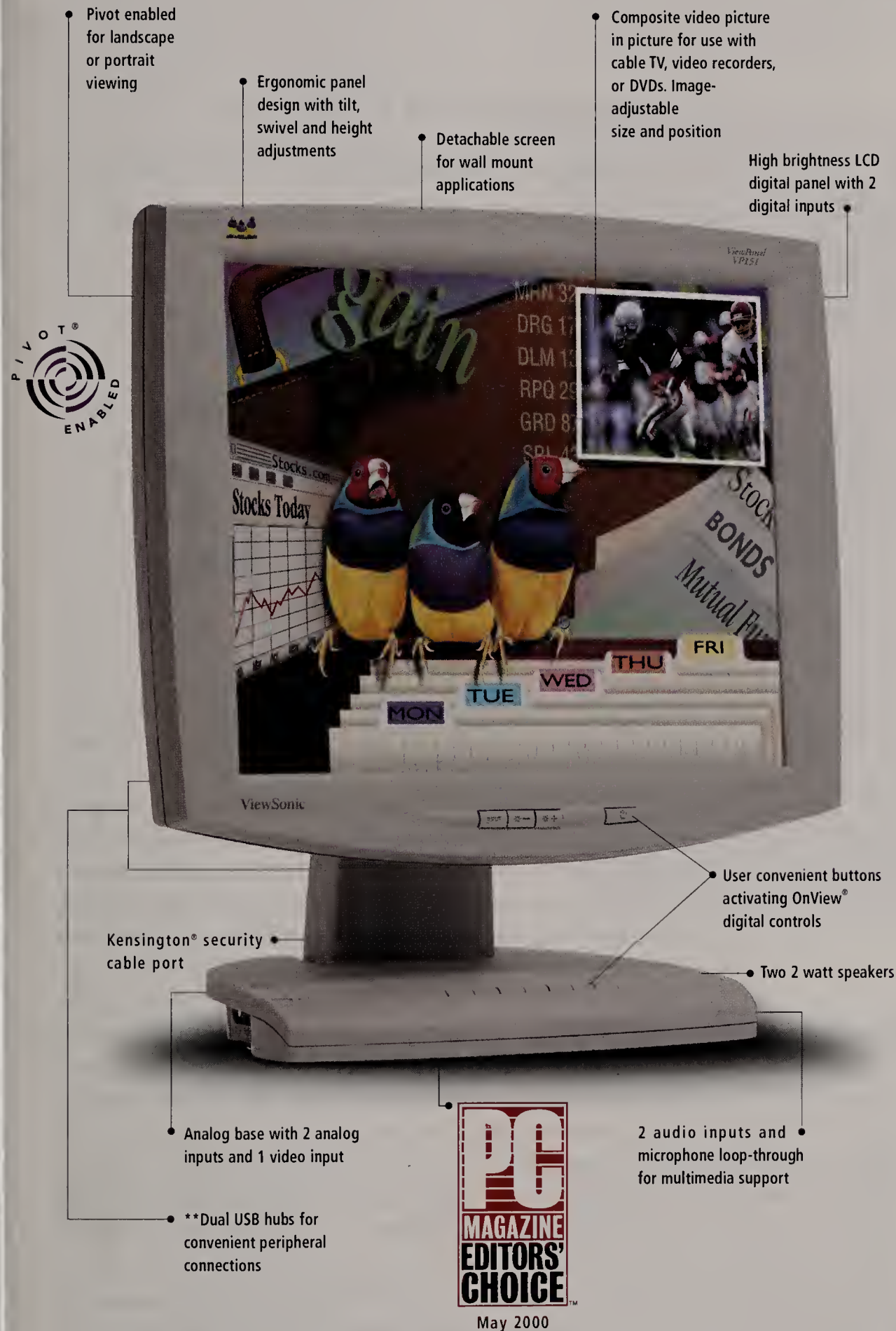
his way at his introductory meeting with IS staff. "It was one hour and 45 minutes of hostility—one cynical, emotional, negative question after the next," Boardman says. Fueling the emotion, of course, was fear of the unknown—what did outsourcing mean to individual employees?

Between that meeting and late October, when a final pact was submitted for board approval, several things happened to allay people's fears. First, CAO Prior, who had developed a bitter relationship with county employees, returned to private industry. His successor, Walt Ekard, has a softer style and engendered far more trust from workers. Next, Boardman and his managers worked hard to educate county staffers on the benefits of working for a big-time IT services company: better pay, training, career options and a chance to work with bleeding-edge technologies. The Pennant Alliance, meanwhile, pledged to give all IT employees a 7 percent raise on Day 1, and then committed to keeping these people in San Diego for a minimum of two years. And those who didn't want to transfer could opt for the severance package or reassignment to other county offices.

By the time the board approved the outsourcing deal last October, only

Can outsourcing work in local government? Share your thoughts with Senior Editor Tom Field at tfield@cio.com.

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What's Your Problem?

A combination of CRM and knowledge management software puts answers at the fingertips of 3M call center reps

BY JOHN EDWARDS

The Company: 3M

Founded 1902 **Revenues** \$15.7 billion (1999)
Headquarters St. Paul, Minn. **Employees** 70,549 (1999) **Customers** Include consumers of basic office products like Post-it Notes and Scotch Tape as well as industrial and manufacturing engineers using advanced adhesives, abrasives, plastics and gases **URL** www.3m.com

A TYPICAL DAY in the life of a 3M call center agent is a lot like spending a not-so-quiet evening with Regis Philbin. The questions keep coming, and the pressure steadily builds.

One caller wants help fixing a laminating machine. Another has a question about the effectiveness of an industrial adhesive. A customer wants to know where she can buy a special type of recording tape. A man in New Jersey needs a copy of 3M's annual report. The next caller wonders why 3M has discontinued its ScotchGuard fabric protection products. Toss me a lifeline, please!

Many Products, Many Questions

Most famous for its Post-it Notes and Scotch Tape brands, 3M (Minnesota Mining and Manufacturing Co.) is a highly diversified company that makes more than 10,000 products. Based in St. Paul, Minn., 3M operates 30 business units, including industrial (advanced adhesives, tapes and abrasives); transportation, graphics and safety (reflective materials, respirators and optical films); health care (drugs, asthma, dental and skin products); consumer and office (tape and Post-it products); electro and communications (insulating products); and specialty material (gases and plastics).

The company's sweeping product range can make life difficult for call center agents, who collectively are expected to provide fast answers to some 1,400 questions per day. "It takes a special type of person to be able to quickly handle business, financial and technical questions," says Paul Guanzini, new business development manager for 3M's Corporate Customer Contact Center.

As 3M began launching more sophisticated and complex products during the 1990s, the

scope and pace of customers' questions began taking a heavy toll on call center agents and managers. Training agents to handle questions relating to software, hardware and consumer goods as well as financial and other miscellaneous queries was becoming impossible, says Guanzini. "It was very difficult for our people to be trained across all those product lines and to be able to talk intelligently with knowledgeable users." To keep pace with customers' increasingly complex questions, agents began decorating their workstations with technical bulletins and product literature; some even resorted to using Post-it Notes as memory cues to products, problems and solutions. "Although we're quite proud of our Post-it Notes, it wasn't a very efficient way of providing support," says Guanzini.

Despite their best efforts to each field an average of 52 calls a day, agents had to escalate 18 percent of those calls to experts within the company. Customers were forced to repeat their stories to each agent and expert with whom they spoke, and they complained of incomplete information or answers that varied depending on which agent they talked to. Some calls took days to resolve, frustrating callers and agents alike. With no way of knowing that someone else had found a solution to a problem, agents were duplicating efforts and taking up experts' time over and over to answer the same questions. The volume of calls escalated to experts in the company's R&D labs was causing a drain on lab productivity. And for a company whose stated goal is to earn 30 percent of sales from products developed within the past four years, anything that hampers innovation is cause for concern.

A Technology Lifeline

To tackle a problem that was leading to internal frenzy and customer discontent, 3M decided to create a technology "lifeline" for its call center staff by investing in both customer relationship management (CRM) and knowledge management (KM) software. The integrated system would manage most points of customer contact,

"It's no longer possible to ask the same question of 12 reps and get six or seven different answers."

—PAUL GUANZINI, NEW BUSINESS DEVELOPMENT MANAGER FOR 3M'S CORPORATE CUSTOMER CONTACT CENTER



Paul Guanzini: Reps no longer have to use Post-it Notes to help them remember solutions to problems.

linking six formerly individual, noninter-connected call centers.

The first step in building the system, recalls Steve Conway, an IT specialist at 3M, was to create a task force to explore the available technology options. "We formed a team of 14 people, representing a cross section of 3M business units," says Conway. The panel, which included customer service managers, call center agents, IT analysts and documentation developers, quickly settled on Remedy Corp.'s Remedy Action Request System to handle call management tasks.

The decision was straightforward because the software is designed to easily integrate with a knowledge management product and doesn't require additional programming to create database logic, workflow business rules and form layouts.

Finding a knowledge management tool, however, proved to be a more formidable task. After considering more than a dozen products, the panel chose a product now known as Primus eCRM from Primus Knowledge Solutions. Not only was the software compatible with 3M's existing hard-

ware and software infrastructure, it also provided a flexible workflow that supports individual approaches to problem solving. Perhaps most important, the software allowed immediate sharing of newly created solutions—eliminating the need for a separate, offline knowledge engineering process.

The System at Work

Compared to the way 3M used to handle customer inquiries, the new system is a model of efficiency and simplicity, says Guanzini. When a phone call comes in, the customer service representative checks the Remedy system to view information about the customer and basic data about 3M products the individual or company uses. He or she then types in the details of the customer's problem. If the representative can't answer the question with the information at hand, pressing an onscreen button transfers all of the data that has been entered into the Remedy database into Primus eCRM's eServer software where it can be used as search criteria. The agent can then launch a search for a solution that answers the customer's question.

The eServer software gives 3M's customer service representatives intuitive access to critical information. Rather than relying on simple keywords, the agents can use natural language statements to describe a problem. The system lets them define a problem statement as a goal, fact, symptom, change, cause or fix (for example, a symptom might be "The X adhesive isn't sticking the X tile to the X surface" while a fix statement could be "What is the best adhesive to use for sticking an X tile to an X surface?"). This flexibility allows them to take into account multiple factors when searching the knowledge base for solutions. The system then presents agents with a weighted list of solutions. "It's not a tree-based, hierarchical system," explains Shelly Waits, a 3M customer service supervisor. "This is a relational system that's designed to bubble-up the most appropriate answers for the particular description that's fed into the system." Every piece of information generated by eServer is available to 3M's entire support staff.



CRM at 3M

Objective: Help call center agents provide fast, accurate answers to customers' questions about a wide range of products; cut agent training time and costs

Process changes: Implement combined CRM and knowledge management software, plus an extranet-based self-service customer support system

Enabling technology: Call management: Remedy Action Request System from Remedy Corp. in Mountain View, Calif.; Knowledge management: Primus eCRM eServer from Primus Knowledge Solutions in Seattle; Web self-service: Primus eCRM Interchange

Scope: Call center operations covering 25 of 30 divisions; internal support for IT, HR, purchasing and procurement

Payoff: Improved solution accuracy, higher problem resolution rates, reduced agent training time and increased agent productivity

If a Level 1 call center agent—the company's front line of customer support—is unable to solve a problem, she can save all of the data entered during the initial call and escalate the call to a senior support professional. The senior support representative then either synthesizes all of the relevant information in the knowledge base into a new solution or follows up with an appropriate expert to find the answer. The new solution then becomes part of the knowledge base.

Launch Time

3M first implemented the new technology in late 1997 in its internal IT Customer Service Center, which handles more than 15,000 technical questions from 3M employees each month. "We quickly saw a higher percentage of calls resolved on the first point of contact," says Conway. "Accuracy and consistency improved, and training time for new agents was dramatically reduced." In 1998, Expert Technical Support, 3M's post-sales customer support division, adopted the technology in a trial project that involved 3M's commercial graphics unit. The first attempt to use the system to serve end customers not only proceeded without any major glitches, it duplicated the IT support department's success. Full-time use of the technology by Expert Technical Support got under way in April 1999. The system now supports 25 of 3M's 30 business units.

The system's overall results have been impressive, says Guanzini. Agents are now able to handle an average of 59 questions a day, a 13 percent jump in productivity. "Since the deployment of the software, we have reduced support training time and costs by 35 percent, improved solution accuracy and achieved higher problem resolution rates at the first point of contact," he says. The first-call completion rate, which once hovered around 85 percent, has increased to about 94 percent. The technology has also cut escalations from Level 1 to Level 2 by 55 percent. That's important, says Guanzini, because it frees up research and development experts to concentrate on their core work—developing new products. And, perhaps most valuable, 3M is building a repository of knowledge that will help its support operations for years to come.

The big advantage for 3M's customers, says Guanzini, is the ability to get correct, precise answers to their thorniest problems. "It's no longer possible to ask the same question of 12 reps and get six or seven different answers," he notes. "That saves us time and effort and gives our customers the right answer on the first try." Call center agent Ralph Rella says the system has made his life—and the customer experience of contacting a 3M

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call center—easier and more pleasant. “The information is literally at my fingertips,” he says. “It makes me feel great to be able to give people, on the spot, the information they need to know.” He says the customers also seem much more relaxed and friendly. Indeed, 95 percent of customers now say they’re satisfied with their call center interactions. (3M did not track this figure before implementing the system.)

An added benefit for 3M is a detailed reporting capability that helps the company monitor the quality and responsiveness of its customer service efforts. “At the end of the month, the system tells our laboratory and marketing people how many people called, who called, which products were involved, what types of problems were encountered and the specific solutions that were offered,” says Guanzini. That information helps the company develop new products and refine existing offerings.

3M is also working to leverage its CRM/KM investment throughout the company. The human resources, purchasing and procurement departments have already adopted the technology to help answer questions posed by 3M employees and business partners. Conway says other departments are evaluating the technology for potential applications.

Self-Service

Over the next several years, 3M plans to add new capabilities to its customer support system. In April, the company began a test allowing customers to question agents via e-mail. But e-mail support can be expensive, since agents and customers often have to bounce messages back and forth several times in order to nail down an answer. So the company is also implementing a self-service extranet with an online troubleshooting option that lets customers access a Web version of the eCRM software. The site will be personalized to focus on products the customer uses or has expressed interest in using. “It looks and feels just like the desktop tool used by our agents. It provides the same knowledge too,” says Guanzini. The self-

service extranet is currently available to customers of 3M’s commercial graphics division. Support for other business units is scheduled to be added over the next couple of years.

3M views its customer-service efforts as an ongoing process. “We’ll probably never complete the system, since new and improved technologies will always become

available,” says Guanzini. “As long as customers have problems, we’ll be looking for better ways of solving them.” **CIO**

Do you have an interesting customer-focused case file to share? We’d welcome it. Send your comments and ideas to casefiles@cio.com. Freelance Writer John Edwards can be reached at jedwards@john-edwards.com.

EXPERT ANALYSIS BY CASSANDRA MILLHOUSE

Maintaining Momentum

3M has taken a fairly typical approach to customer service: First, sort out the process of managing inquiries, then apply knowledge management to help agents answer the inquiries themselves. However, most organizations find it difficult to move beyond the first stage, and 3M is to be congratulated for getting as far as it has. Further, 3M has measured its results, which is extremely important. When a technology reduces costs rather than driving revenue, the benefits need to be demonstrated, or they are soon taken for granted.

To continue to reap advantages from its CRM/KM system, 3M must be vigilant about keeping its knowledge base current. Often knowledge management projects achieve success only to fade away after the initial benefits seem to be won. Knowledge management must be an ongoing initiative, and knowledge must be kept up-to-date to be useful. In fact, out-of-date information in a KM system actively discourages use.

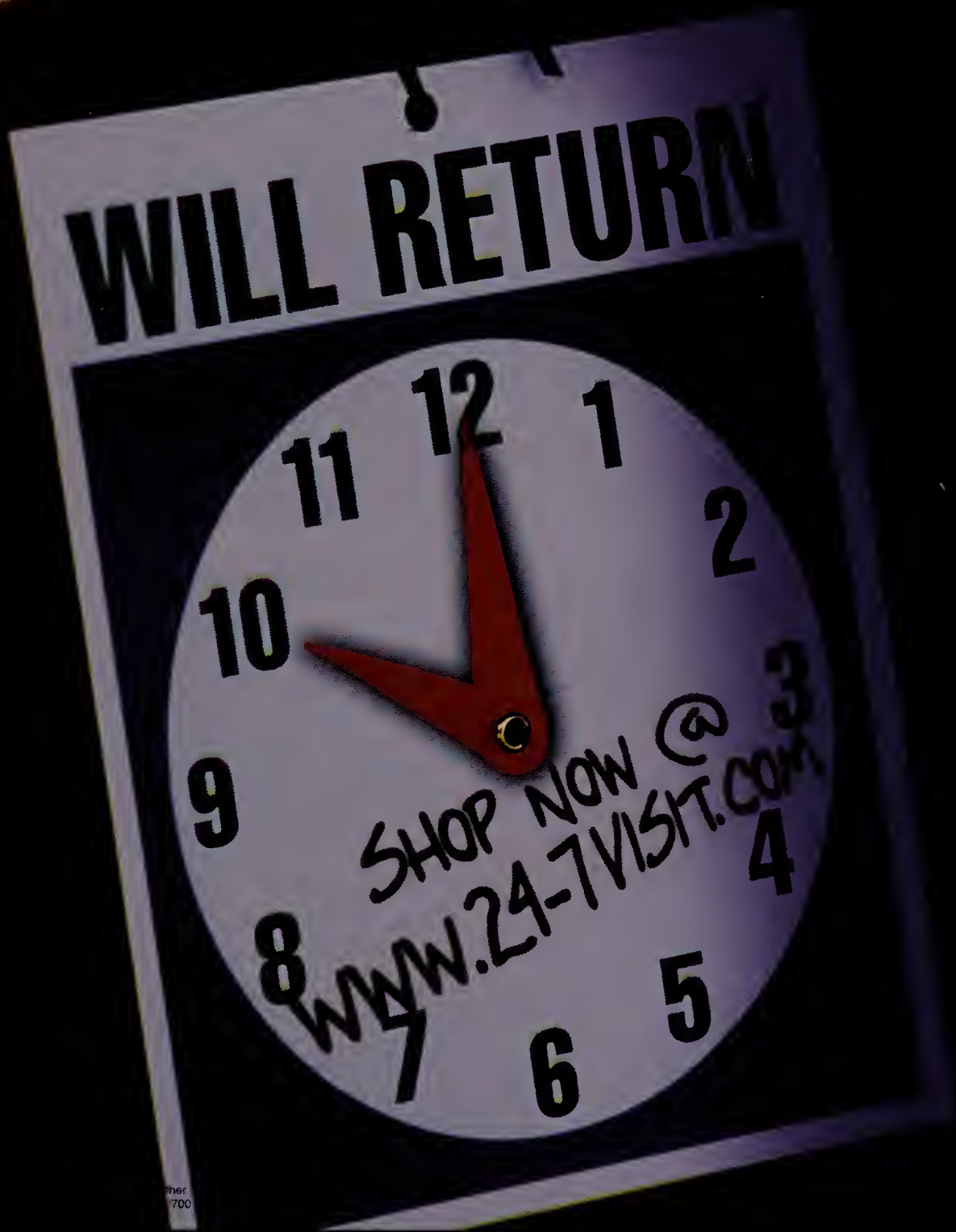
Plans to offer self-help to customers over the Web make it even more essential for 3M to keep support knowledge current. Although self-service can increase customer satisfaction and loyalty as well as reduce costs, it needs to be well executed. Customers are not nearly as forgiving with problems and glitches in the system as employees are. Employees often end up fine-tuning their search criteria to find the information they are looking for—and they find that the textual quality of the solutions sometimes hampers their efforts. Self-service makes it imperative that 3M maintain a high level of quality in the solutions in its knowledge base; although employees will persevere in their search, customers won’t.

3M is wise to share its call center activity reports with the marketing and R&D departments. This priceless insight into customers’ needs and requirements gives 3M the ability to continuously respond to customer demand. And in the end, that may be of more value to 3M than the improvements in productivity and training time achieved in the customer service operation.



Cassandra Millhouse is a senior analyst at Ovum, a London-based consulting and analysis company. A specialist in CRM, she was the lead analyst for the Ovum reports “eCRM: Personalization Technologies for the Web” (2000) and “Ovum Evaluates: CRM in the Front Office” (2000).

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New design tools plus the Internet equals a revolution in product development

ALL

BY PAUL KANDARIAN

TOGETHER NOW

A manufacturing manager in New York City looks at a manufacturing model on his computer screen. At the same time, a supplier in California sees the same model on her screen. Meanwhile in Europe, engineers tap their keyboards to make the model rotate and change shape. The supplier sees gaps in the design, determines what's needed to fill them, and lets the rest of the group know if she can create the parts required for the final product. All told, the design process happens simultaneously, saving

Reader ROI

- ▶ Learn how the Internet affects product development
- ▶ Find out how some companies use collaborative development tools

Collaborative Computing

valuable design time and—in the final analysis—money.

If this scenario sounds revolutionary, it is. But the revolution isn't coming—it's here. According to industry experts, collaborative product development—the process of sharing information in the design and creation of products to greatly speed manufacturing—is here in very real-time.

Collaborative development “is truly an electronic revolution,” says Ken J. Versprille, program manager and senior analyst at D.H. Brown Associates, an IT research firm and consultancy in Port Chester, N.Y.

NO BOUNDARIES

Those are bold words, but they're not without credence. The prospect of simultaneous product collaboration, across geographies, time zones and corporate boundaries, has only been possible for the last couple of years as more companies and vendors take advantage of the lightning capabilities of the Internet, says Alex Cooper, president of The Management Roundtable in Waltham, Mass., an organization that advises businesses on streamlining product development. “The evolution of the Internet has facilitated a lot of collaborative product development,” he adds.

One company that has already joined the collaboration revolution is General Electric Industrial Systems, a GE business unit that makes electrical equipment, such as fuses

and transformers, and provides related services. Engineers at the company have created Web City, the company's intranet, which was originally created for collaboration within the sourcing and technology group. In Web City, projects can be broken down into tasks and tracked. Web City stores updates in virtual folders that other team members can see, and also allows the company to capture best practices and repetitive tasks to apply to new projects.

“Our business is very diverse globally, with more than 100 plants and 20 design centers, and the most efficient way to tie folks together is via the Web,” says Eric Reed, leader of engineering systems at GE Industrial Systems. “What we can do for the first time is get global teams working together on the same projects in Asia, Europe, South America and the United States.”

Large multinationals aren't the only converts to collaborative tools. Lightolier, a Fall River, Mass.-based manufacturer of residential and industrial lighting, uses a suite of software from CoCreate Software, a Hewlett-Packard company that makes two- and three-dimensional design tools, to create its products, says Gary Marn, director of IT for Lightolier. For contractors seeking

products, Lightolier supplies them with a CD specifier—a disc that allows them to view a product line onscreen and make specific requests for design modifications, Marn says.

“Contractors can get into a virtual room and configure any type of lighting,” Marn says. “Let's say you're a Japanese developer, and you see a fixture you want, but the flange is too large. You can see it, and actually rotate it, and then my designer will take it on his 3-D CAD, change the specs and make it work for the contractor.”

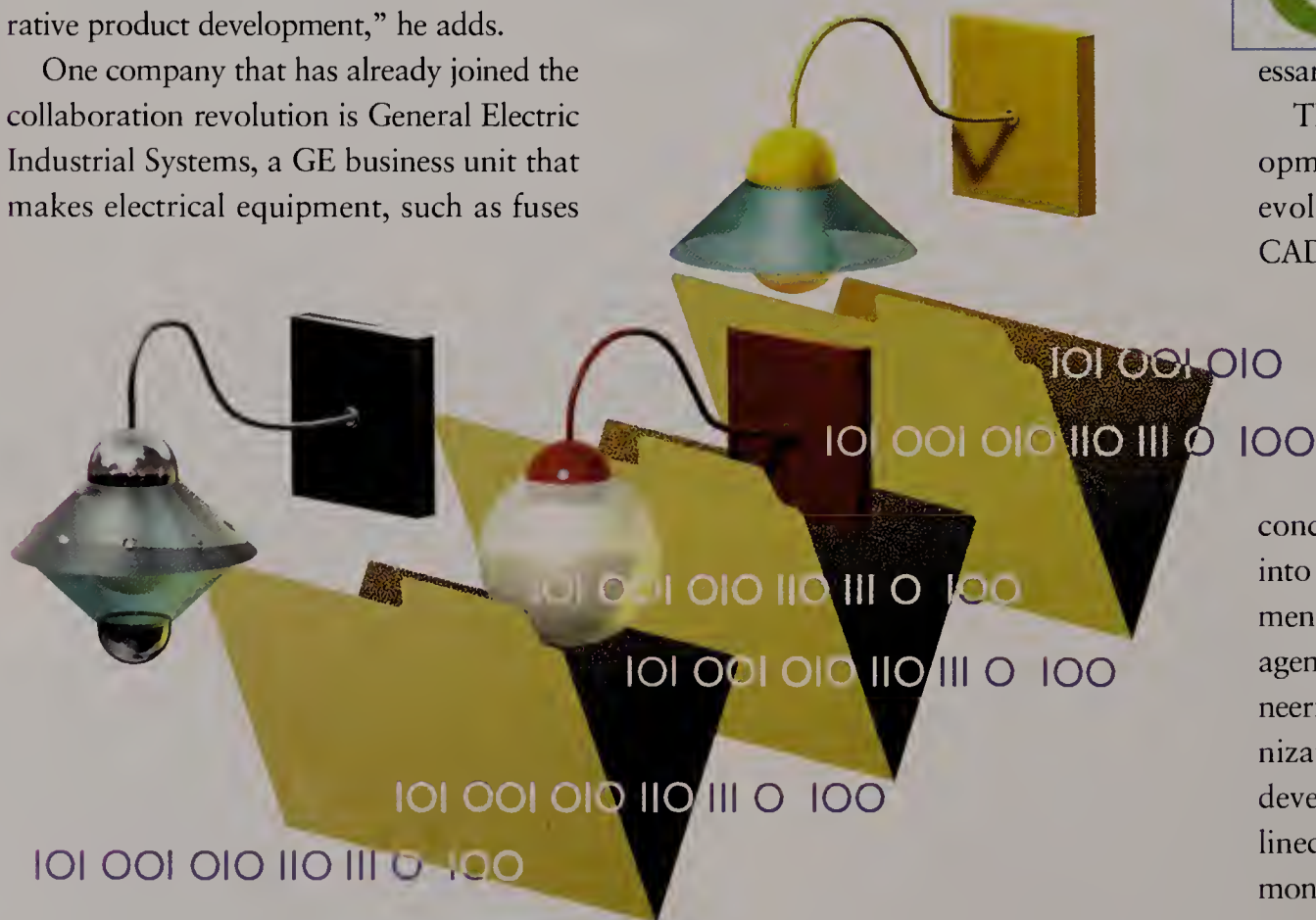
Of course, this evolution isn't without challenges, chief among which are data security and interoperability of collaborative tools. Yet, despite these hurdles, manufacturers realize that they have to make the leap to electronic collaboration to compete in the ever-accelerating product cycle race.

Sharing designs, specifications and other information crucial to timely manufacturing can only be done by sharing that information throughout the whole process, from engineering down to suppliers, Versprille says.

LONG TIME COMING

Cooper agrees that collaborative product development is the next giant step in technology, but, he adds, “a lot of it is evolutionary, not necessarily revolutionary.”

The idea of collaborative product development came about in the early 1980s, evolving from department automation to CAD people “doing 10 times the number of drawings they could do before, but it didn't speed product development,” says Cooper. The process morphed into concurrent engineering, which formalized the concept of bringing manufacturing people into the design process early. That development coincided with the total quality management movement. Then, with the reengineering movement and downsizing of organizations in the mid-'90s, the process of developing products became more streamlined, all in the interest of saving time and money, Cooper says.





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* Source: Media Metrix, May 2000



"Now the next generation has to deal with companies outsourcing what they don't do well, and it means more partnerships and sharing of data," he says.

Using the automotive sector as an example, Versprille estimates that up to 60 percent of vehicles are designed outside the Big Three's corporate walls. "It's happening more and more, and the level of expertise needed to do individual tasks—to design grills, engines, interiors—has gotten fairly sophisticated," he says. The end result is that a lot more collaborative product development and design needs to occur between the automotive makers and their legions of suppliers.

Seeing a product as it is designed is key to

that is simpler than older CAD technology. In doing that, visualization vendors have been able to take exact geometric data from a variety of systems and combine it into a visualization environment. For example, a Big Three automaker can get a body design from Germany and an engine design from Japan and combine the two in real-time for review by engineers in a Detroit conference room.

NEW TOOLS ON THE BLOCK

In the electronic age, simultaneous collaboration is the next big thing, and many companies are poised to provide these services. Alibre, an application service provider based in Richardson,

key features include Web-enabled collaboration in real-time, and enhanced SSL security to protect customer data.

Also leaping into the collaborative market is Structural Dynamics Research Corp. (SDRC), a Cincinnati-based company, which last spring announced a three-pronged strategy for e-business collaboration and innovation: product knowledge management (PKM), which includes SDRC's product-data management tool; collaborative product commerce (CPC), which includes Accelis, a tool that centers on nonproprietary, standards-based technologies; and e-design automation.

In June, SolidWorks, a manufacturer of

IN THE ELECTRONIC AGE, SIMULTANEOUS COLLABORATION IS THE NEXT BIG THING.

quickly streamlining its creation, Versprille says. He notes that one of the latest developments in the field—visualization software—takes complicated geometric CAD models and presents them graphically in a format

Texas, offers Alibre Design 1.0, a subscription-based service that can connect engineers and designers within and beyond a company's firewall. Alibre Vice President of Marketing Greg Milliken says the program's

3-D CAD software for the mainstream market, announced the release of its 3-D Meeting, an add-on to SolidWorks software that enables users to view and share mechanical designs in real-time over the Internet. 3-D

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Meeting aims to enhance design communication by enabling vendors, manufacturers and customers to participate in live, online meetings to review SolidWorks models.

SECURITY CONCERNS

Despite the streamlined processes promised by tool vendors, many potential users are nevertheless concerned with security issues. With more and more information being zapped across a company's firewall, the issue of protecting that information—and making sure it's viewed only by the eyes that are supposed to see it—naturally arises.

"There are definitely some tools coming into place that make it easier" to maintain security, Cooper says. "But it also comes down to a lot of trust issues. And how can you digitally enforce trust?"

Security in collaborative product development and the sharing of any information falls into two realms, according to Evan Yares, president of the CAD Society, an industry trade association based in Bethesda, Md. "One realm is knowing your data is safe and won't be lost, and that's a hardware-related issue, using an infrastructure with backups made on a regular basis," says Yares, who is also president of OpenDWG Alliance, an association of CAD customers and vendors that promote AutoCAD's Autodesk as an open, industry-standard format for the exchange of CAD drawings. "That's probably a given, but I've seen people lose data because they don't have that policy in effect," he says.

"The other issue is data security, critical data that is out of your control. If you're designing the next new big thing and it's served up over the Internet or a corporate extranet, you have legitimate concerns regarding the issue of good practices," Yares says. "If the company has good practices, you make sure you apply all security patches to the system on a regular basis, and you have an infrastructure that supports normal-level security."

A good policy notwithstanding, is there

still a fear that a company product or design might be seen by the wrong eyes, and the design could end up elsewhere as the next big thing before the original company has a chance to create it?

"Of course that's a fear; your ideas are out there for all to see," Yares says. "But we live within the legal system. We have patent and copyright protection. The truth is, we're a nation of laws. Collaboration tools don't change the formula [for protection] at all."

PROPER PRECAUTIONS

Laws or no laws, Yares says companies can take other steps to protect their critical data. Industrial espionage used to consist of spies going through a company's trash, making paper shredding a standard security practice. Now industrial spies sift through bits, making it a necessity that companies perform the electronic equivalent of paper shredding—data encryption.

Of course, there's always simple honesty

ground and allows vendors that promote collaboration to publicly show it, but also brings those vendors that have policies that frustrate collaboration out in the open," he says. "These are simply policy guidelines, they bring things out to the light of day." (See "Play Nice," Page 152.)

For companies that currently use collaborative development tools, security is often more than a voluntary effort. At GE Industrial Systems, security is of utmost importance, says Larry Sollecito, general manager of e-commerce. "There's a large effort at the GE corporate level—and with us—to ensure security. When we talk about collaboration with customers, we have EliteNet, the customer's way of interfacing with us over the Internet," he says. "It's very secure, with three levels of personalization. And under that, we put collaboration tools in interfaces in Web City. It's a very secure system outside the firewall for customers to interact with us."

Some companies, instead of outsourcing collaborative product development, are cre-



and cooperation. The CAD Society has created Interoperability Guidelines (IG), the first step in an industrywide code of ethics to which vendors and users may subscribe on a free, voluntary basis (more information is available at www.cadsociety.org).

"The IG simply puts a stake in the

ating their own computer architecture to do the job.

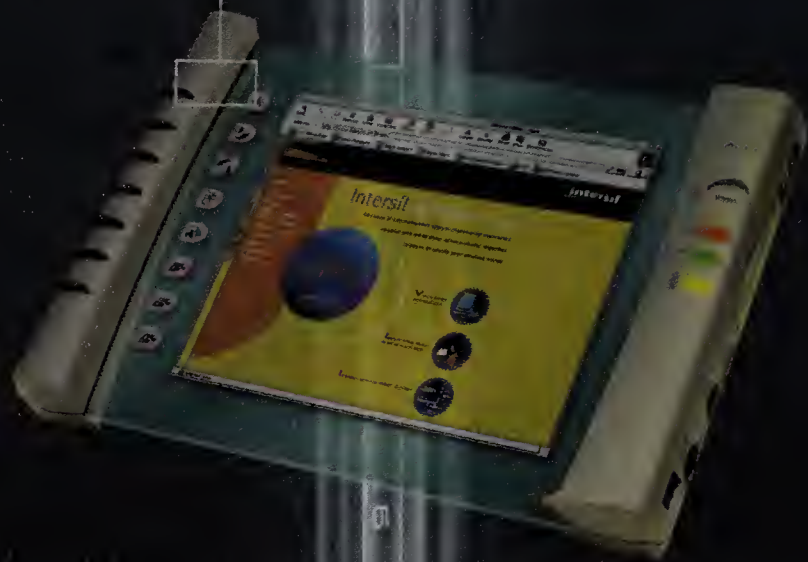
At GE Industrial Systems, Web City engineers designed the system's architecture but capitalized on some off-the-shelf tools as components of it, according to Sollecito. The system supports about 500 projects

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PLAY NICE

The CAD Society Interoperability Guidelines are a contract between CAD vendors and their customers. By subscribing to these guidelines, CAD vendors make a statement that they support interoperability between different CAD programs and will establish their business policies accordingly. CAD users, by subscribing to the guidelines, make a statement that they support interoperability and will purchase CAD software only from vendors that have a similar policy.

Although the guidelines are drafted specifically with respect to CAD software, they are equally applicable to other engineering software, including but not limited to, computer-aided manufacturing, computer-aided engineering, product data management and engineering data management.

According to Evan Yares, president of the CAD Society, the guidelines form a framework that says, "We won't get in the way of others trying to build software that works with ours—even if they are our competitors."

Here are the guidelines:

The data belongs to the customer. CAD users invest tremendous amounts of money and resources developing CAD data. The CAD vendor shall do nothing to prevent customers from using their data in any manner or form they desire.

Data encryption has its place but must be controlled by the customer. Yares says certain CAD vendors have encrypted the data produced by their programs to prevent their competitors from building software to read those data files.

Interoperability is impossible if companies won't cooperate.

By adhering to this guideline, CAD vendors agree to license their software—at prevailing rates—to others for the purpose of developing interoperability software.

The Internet is the backbone of CAD interoperability. The CAD vendor agrees to license its software for use in data translation on Internet-connected servers at prevailing rates no greater than those charged to preferred customers.

—P. Kandarian

with 700 users in 300 teams, he says, and consists of GE's internally built applications on top of an Oracle database. GE also uses Elite-Net as a collaborative tool for customers to interface with GE over the Internet, he says.

DOUBTS REMAIN

But while many manufacturers are jumping on the collaborative product-development bandwagon, it's still new enough to make some shy. "The adoption rate into some of these manufacturers will take some time. They can't just drop the way they do things to switch over," Versprille says.

For one thing, the risk of a software glitch, which can shut down manufacturing operations, still exists. Many companies are evaluating visualization technology before taking the plunge. In addition, many companies are set in their established ways. Introducing collaborative technology that promises to change how teams currently operate is a daunting prospect.

"Most companies with collaborative technologies will set up trial runs on the side and

A BURGEONING MARKET

Collaboration is big business. According to a study by Collaborative Strategies, a San Francisco-based management services company, real-time collaboration tools (also known as data-conferencing tools) constituted a \$500 million market in 1999, which was more than double (111 percent) the 1998 market. Collaborative Strategies predicts an annual growth rate for this market of 64 percent per year through 2002. In comparison, the individual teleconferencing and videoconferencing markets, while much more mature and larger in dollar volume, are expected to have annual growth rates of just 19 percent and 25 percent, respectively.

feel very comfortable with that before moving more into production," Versprille says.

Some companies adhere to collaborating the old-fashioned way: by sharing information among a small, in-house group of creators. Such is the case at Sonic Innovations of Salt Lake City, a maker of customized hearing aids. Ross Ryding, vice president of operations and CIO, says the company doesn't use "fancy new tools" for collaboration because 99 percent of the design work is done internally at the Utah facility and "we have only five engineers, not thousands."

When it comes to collaboration, Ryding says, "nothing is better than good discipline among engineers sharing data."

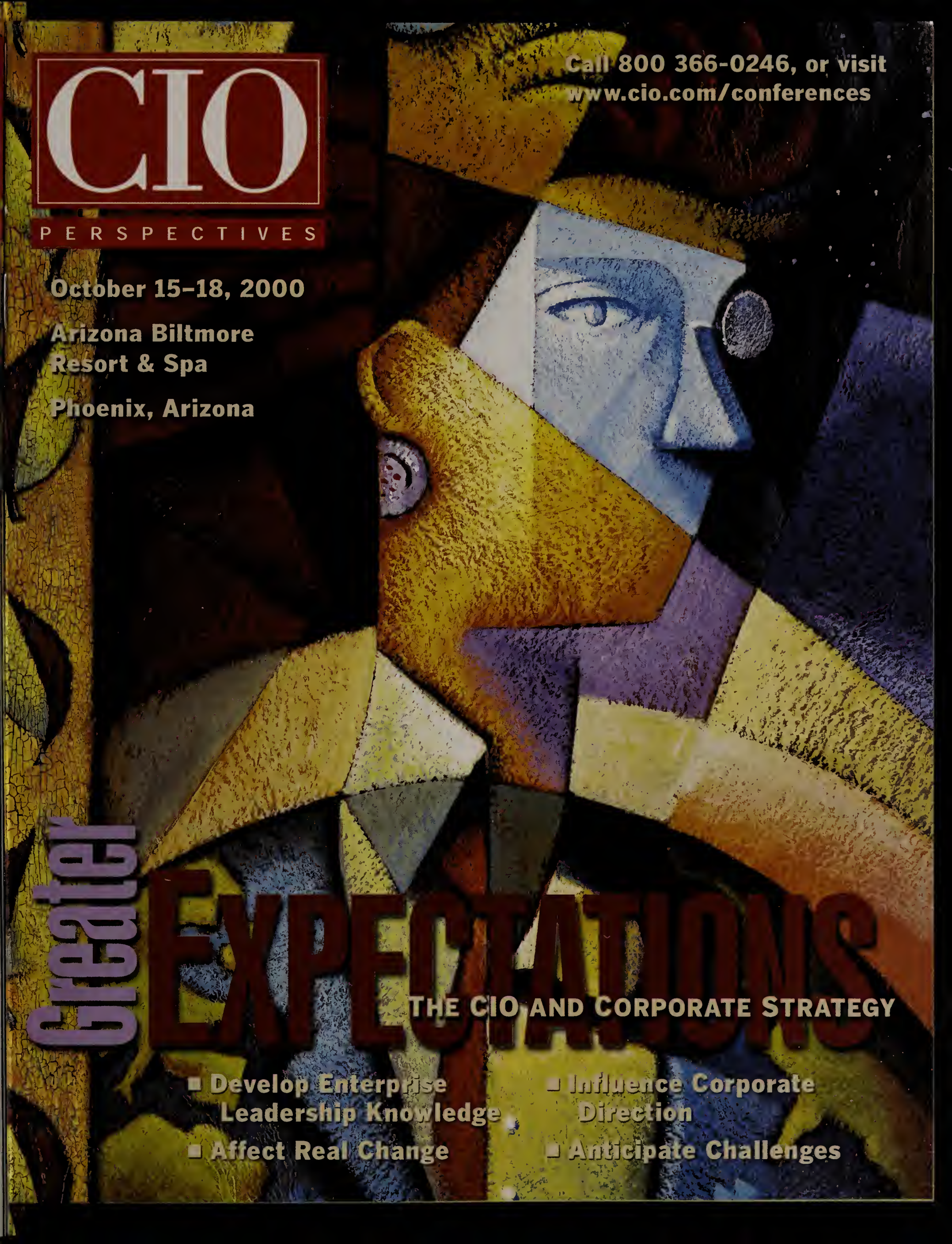
Still, he won't discount ever using outside collaboration tools. "It's something we're looking at, but we hold most of our key technology as proprietary," he says.

But for many companies, the Internet will be the driving force that will make collaborative product development a necessity. "The Internet is really, really accelerating it," says GE Industrial Systems' Sollecito. "Historically, people were able to do this sort of activity in

their work environment only, but now with the Web they can weave their lifestyles into it better. Instead of conferencing at 8 p.m. in the office, they can do it at home on the Internet."

As more tools come to the market that enable companies to collaborate in real-time more effectively—in ways that save both time and money—product design and development will never be the same. **CIO**

Paul Kandarian is a freelance writer based in Taunton, Mass. He can be reached at pkandarian@aol.com.



CIO

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EXPECTATIONS

THE CIO AND CORPORATE STRATEGY

- Develop Enterprise Leadership Knowledge
- Influence Corporate Direction
- Affect Real Change
- Anticipate Challenges



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overview

Greater Expectations: it's all about more. More responsibility for business strategy. More complexity in a 24x7 global e-commerce market. More technology coming at you. More scrutiny from the executive management team. More risks. Hopefully, more rewards.

How these new expectations will impact you, what they mean for your organization, and what they portend for the future of both are at the heart of the next *CIO Perspectives®* conference, **Greater Expectations: The CIO and Corporate Strategy**, October 15-18, 2000 at the Arizona Biltmore Resort & Spa in Phoenix.

We'll explore why it's crucial for the CIO to be a leading force in shaping and driving corporate business strategy, as you join with noted authors, experts, and your peers to dissect key aspects of this additional role for the CIO.

Fellow CIOs **Sandy Goldstein** of Airgas, Inc. and **David Aldridge** of Home Shopping Network share their approaches to understanding the depth and breadth of the changes in the business environment today, and how that is reflected in their strategies. Yale School of Management's **Jeffrey Garten** stresses the importance of rethinking everything when you go global. **Michael Earl**, acclaimed business author and professor of information management at London Business School, presents the results of new research he'll be conducting this summer on what it takes to be — and what is expected of — a CIO. Avon's CIO **Harriet Edelman** talks about translating high-level strategies into actionable plans for aligning IT to business needs. And **Richard Barrett**, author of *Liberating the Corporate Soul: Building a Visionary Organization*, explains what cultural capital is and why it should matter to your overall business strategy.

You won't want to miss our new **Venture OnStage** session, where five CEOs present what they each hope will be the next technology blockbuster.

You'll also be able to meet with executives of our Corporate Host companies during their business briefing presentations, and in a more informal atmosphere during breaks in the display area.

To enroll, fax the enrollment form (on the back cover) to 508-879-7720, call us at 800 366-0246, or enroll via the Web at www.cio.com/conferences. The Web site also contains news and information on the agenda, companion program, Venture OnStage, travel and hotel information.

We think this program will be especially provocative, and we look forward to seeing you in Phoenix!

Lynda Rosenthal
Executive Vice President and
General Manager, Executive Programs
CXO Media, Inc.

Gary Beach
Group Publisher
CXO Media, Inc.

Greater It's all about EXPECTATIONS

THE CIO AND CORPORATE STRATEGY

TAKE THE LEAD ... OR GET LEFT BEHIND

Using data and examples gathered in the summer of 2000 from the USA and Europe, Earl documents how significant organizational and strategic market forces are

GLOBALIZATION OF THE ECONOMY, increasingly complex technology demands, the need to formulate and drive corporate strategy, the Internet and e-commerce — these are just some of the forces pressing on today's CIO.

Clearly the very concept of what it means to be a CIO is undergoing a radical transformation. Now, more than ever, the CIO is being asked — no, required — to master many domains. From inveterate leader of a group of highly-skilled professionals tasked with constantly adapting the enterprise's infrastructure, to business visionary capable of recognizing the changing needs and seizing bottom-line opportunities — this is not your old-style CIO.

In our much-ballyhooed new economy, CIOs will figure in every tactical and strategic direction the corporation undertakes. The demands are as daunting as the potential rewards are unlimited. What's it all about?

It's about **Greater Expectations: The CIO and Corporate Strategy**, of course — the theme of the October 15-18, 2000 *CIO Perspectives* conference at The Arizona Biltmore Resort & Spa in Phoenix.

To get a more meaningful view of the 'greater expectations' now facing

CIOs, we turned to several well-known and respected authorities for their insights and advice. What we discovered confirms that the current dialogue regarding the transformation of CIOs — and the importance of their involvement in corporate strategy — is not just hype. Indeed, Michael Earl, Professor of Information Management and Director, Center for Information Management at the London Business School, has extensive research data documenting the emergence of a model CIO for the New Economy.

affecting IT practices and reshaping the role of the CIO.

"My research shows that CIOs are being asked to substantially increase their participation in shaping the strategic direction of the company, to accept more responsibility for initiating business change projects, and to become more aggressive in introducing new technology into the organization," he reports.

Based on his research, Earl has created a "model" CIO for the future that other CIOs can use to position themselves. "I have data clearly demonstrating the evolving role of the CIO, from the last five years to what I believe the CIO will look like five years from today," he says. "I hope CIOs will be able to assess their own experiences and capabilities against the model CIO suggested by my research, and construct a personal development plan to equip them to become new-economy CIOs."

Among the skills this new breed of CIO will need to meet the challenges posed by a global, Internet-based economy, he says, are "technical com-

welcome

It's all about Greater Expectations

petence, business acumen, and the ability to lead people."

Technical competence, Earl notes, comes from years of experience within the IT function. The key to acquiring the more non-traditional knowledge they'll need is for "CIOs to spend more time outside the IT department and outside the organization."

MEASURE THE INTANGIBLES, AND HARNESS THEM

No CIO seeking career success and corporate profitability can ever underestimate the importance of keeping customers happy. But keeping customers happy, believes Richard Barrett, author, consultant and founder of Corptools.com, depends on attracting and retaining the best people. For Barrett, finding effective techniques that release new levels of employee creativity and productivity is one of the biggest issues facing executives today. And the way to address these issues, he says, is by building cultural capital.

But what is cultural capital? "It's the intangible assets of a corporation," says Barrett. "These are usually not reported on the balance sheet. Cultural capital includes employee creativity, productivity, knowledge or intellectual capital, experience, and emotional intelligence as well as customer relationships and the goodwill of society. Companies with high cultural capital focus their energies on employee fulfillment, customer satisfaction, and social responsibility. Their leaders are vision-guided and values-driven.

They inspire and motivate people. Companies with a high degree of cultural capital are usually more successful over longer periods of time than companies that are low on cultural capital."

Barrett views the role CIOs should play in measuring and managing cultural capital as twofold. "First, CIOs need to show the leadership team how metrics can be used to measure cultural capital and, secondly, CIOs must provide regular updates on what is happening to cultural capital in the organization," he says.

Barrett sees cultural capital as "the new frontier of competitive advantage. If you want to attract and retain the best people," he says, "then you need a great corporate culture that provides physical, emotional, mental, and spiritual fulfillment to everyone in the organization. By spiritual, I mean a sense of meaning, making a difference, and service."

CIOs need to "get an appreciation for the possibility of measuring the intangibles — particularly cultural capital. The intangibles represent such an important part of what makes a company successful," he stresses.

SOURCE BRAINPOWER WHEREVER YOU FIND IT

Jeffrey E. Garten, Dean of the Yale School of Management, also sees a human equation at the foundation of corporate strategy.

Based upon his recent book, *World View: Global Strategies for the New*

Economy, and interviews conducted with 40 of the world's top CEOs for his forthcoming book, *The Mind of the CEO* (January 2001), Garten says that the "biggest challenge will be to maximize the advantages of global reach." And to do that, companies must develop a dramatic new business model.

"In the early 21st century this will mean sourcing brain power rather than low-cost manufacturing sites," he explains. "As Jack Welch says, 'you have to get every mind in the game.' The winning global companies will find talent where others cannot — in rural China, in northeast Brazil, in small towns in Eastern Europe. This is a new game for most corporations — whether they are American, European, or Japanese — because most have relied on their own intellectual pool to fuel growth and profits. That won't work in the global economy anymore."

UNDERSTAND THE NEW ECONOMY CUSTOMER

Communicating with and anticipating the needs and demands of an increasingly complex workplace — as well as increasingly sophisticated on- and off-line customers — must be the focus of a CIO's attention, according to Sandy Goldstein, Senior Vice President and CIO of Airgas, Inc.

Goldstein further believes that very few organizations will be insulated from the change e-commerce demands. "E-commerce is altering the relationships between customers and vendors," he says. "Understanding

your customer needs and being able to respond on a 24x7 basis is now a business imperative. Competitive pricing and quality products and services are only the sub-plot," he says.

Not surprisingly, Goldstein also sees a larger role for CIOs. "CIO skills need to expand to meet these growing demands," he says. "In the past, keeping technology running and meeting internal customers' needs were paramount. Today external customers and solutions to run the business are key."

But how can an organization (and its CIO) decide about aligning IT with the business, versus aligning IT with customer needs, versus IT driving business strategies for the new on-line economy?

"It's not about deciding," Goldstein asserts. "Your customers have already decided. The new CIO must align IT with the business, meet customers' needs, and create new strategies for working in the online economy. The only decisions are under what governance this function should operate and how fast you can get there."

And what can CIOs do to communicate within their organizations so that IT can understand and address customer needs and demands?

"Many novel approaches exist," he points out. "My business, for example, has successfully utilized distributed work teams, where IT lives with

the customer. We also employ customer-driven management and, in all cases, cooperative project teams. We take advantage of tools such as voice and video conferencing, intranets, extranets, chat rooms, bulletin

"My research shows that CIOs are being asked to substantially increase their participation in shaping the strategic direction of the company, to accept more responsibility for initiating business change projects, and to become more aggressive in introducing new technology into the organization."

Michael Earl, London Business School



boards, mobile offices, flex time, and the like. In addition, Airgas has a program called 'externships' where we send all IT professionals to customers' locations from one to four weeks a year to learn more about our customers' businesses."

Goldstein also offers a number of novel ways for CIOs to communicate with customers to make sure the organization is keeping them happy. "We use a feedback process and surveys, as well as letting our customers complete project performance reviews for our associates," he says. "Financial incentives are tied to the reviews," he adds.

INTEGRATE OLD AND NEW CULTURES

Moreover, as an organization's e-commerce capabilities evolve, adds David Aldridge, Executive Vice President and CIO of the Home Shopping Network (HSN), CIOs can expect to deal with several important cultural and business changes. "The integration of e-commerce — both technical staff and their initiatives — with legacy staff activities has definitely impacted our internal culture," says Aldridge.

The major technical challenges of e-commerce implementations are the integration of the front-end e-commerce engine with the back-end legacy systems that support core business, he believes.

But, he notes, "there are significant staffing issues that CIOs need to address as their organizations adapt to New Economy opportunities, including the need for hiring, retaining and/or retraining staff with the appropriate skills to deliver e-commerce solutions quickly. And with the current staffing shortage approaching one million professionals, there are challenges for us all."

What advice does Aldridge offer CIOs as they guide their organizations into e-commerce competition?

"You must create a separate IT group

welcome

It's all about Greater Expectations

to focus on the demands of e-commerce," he says. "But don't underestimate the complexity of integrating an e-commerce front-end with legacy systems. Getting there with something reliable and scalable is more important than getting there quickly. Of course, you still have to get there quickly!"

Yet as important as e-commerce is, Aldridge offers a warning: "While the present focus is on e-commerce, which presents a new opportunity to link with customers and suppliers, many companies will continue to drive earnings from legacy applications."

Yale's Garten also cautions about current conventional wisdom concerning Internet competition and the new economy. His views are shaped by his experiences as Undersecretary of Commerce helping US firms break into foreign markets, as well as time spent managing Lehman Brothers' Asia operation.

"The most listened-to consultants and academics have been saying traditional global companies will be taken to the cleaners by the new Internet firms," he says. "Guess what? They are wrong. The empire is striking back. Most global CEOs, while slow to start, are embracing the Internet with tremendous force. Yes, it's a tough change, particularly culturally, but it will happen. The empire will — indeed, it already is — striking back."

FOSTER REALISTIC EXPECTATIONS

CIOs must learn to communicate effectively to the wider corporate community. Dr. Jim Wetherbe, Stevenson Professor of IT, Texas Tech University, warns that unless CIOs do this, IT will

"The winning global companies will find talent where others cannot - in rural China, in northeast Brazil, in small towns in Eastern Europe. In the early 21st century this will mean sourcing brain power rather than low-cost manufacturing sites."

Jeffrey E. Garten, Dean, Yale School of Management



lose control over user expectations. As a veteran of the IT trenches himself, Wetherbe has first-hand experience of customers' disappointments when differences exist between what's received and what was anticipated.

"Employees and executives have unrealistic expectations of their information systems and tools, such as what they're going to get, when they're going to get it, and how much it's going to cost," says Wetherbe.

Such unrealistic expectations develop in a variety of ways, including

wishful thinking, miscommunication, creeping expectations, and a curious phenomenon he calls 'the void.'

For example, IT delivers an accounting application designed to improve cash flow. The applications meet all of the agreed-on specifications, but suddenly your user asks, 'So, when do we cut staff?' Where did that expectation come from? Well, in this case the user believed it was the purpose of all IT systems to reduce headcount — this was never agreed to by IT, but it was assumed to be part of the process by the user."

"There are very practical, straightforward, streetwise ways that every CIO should know to minimize this vexing problem," he says. "Part of the reason users have unreasonable expectations is because they don't really understand how difficult IT tasks are," he notes. "CIOs need to learn how to be proactive in communicating; they need to tell their story to the rest of the organization. Many IT professionals confuse hard work with recognition — it's not the same thing."

There's little confusion about where the CIO's role is heading, and the need for today's practitioners to influence corporate strategy with a blend of technical knowledge, business acumen, and leadership ability. It is, after all, about greater expectations.

SUNDAY, OCTOBER 15

11:30 am - 3:30 pm **The Leaderboard Classic Golf Tournament**
Hosted by Lockheed Martin Corporation

3:30 pm - 5:30 pm **Conference Registration**

6:30 pm - 8 pm **Welcome Reception and Registration**

8 pm - midnight **Hospitalities/Networking**

MONDAY, OCTOBER 16

7:30 am - 8:30 am **Breakfast**

8:30 am - 8:45 am **Welcome, Opening Remarks and KnowPulseSM Poll**



Gary Beach
Group Publisher
CXO Media, Inc.

The KnowPulse "Knowledge" poll, an ongoing opinion poll conducted by CIO magazine, captures IT and business executives' perspectives on current topics in the news. Past polls have been covered in CIO magazine, as well as other prestigious media organizations, including CNN, Newsweek, The Wall Street Journal, and U.S. News & World Report.

8:45 am - 9:30 am **Managing the Expectation Gap**



Dr. Jim Wetherbe
Stevenson Professor of IT, Director of IB2 Research
Texas Tech University

Conference Moderator

People become disappointed when differences exist between what they receive and what they expect. As a professional group within an organization, IS teams in general work longer days and harder per hour, and give up more weekends than any other group. Yet, despite their commitment, they often do not receive the recognition they deserve for their personal sacrifices. The problem is that what is delivered often does not meet expectations. Such gaps usually surface when organizations dynamically change their expectations of IT without the CIO's knowledge or input, or when users acquire unrealistic expectations about its benefits. Wetherbe explores the phenomena of expectation gaps, and suggests approaches CIOs can use to effectively manage them.

9:30 am - 10:30 am **The Train Needs To Fly: Technology Alignment in a Rapidly Evolving Business Environment**



David Aldridge
Executive Vice President and CIO
The Home Shopping Network

The Home Shopping Network (HSN) pioneered the electronic retailing industry in 1977. From a rather simple business model, HSN has evolved into an electronic retailing powerhouse with live programming 24 hours a day, 364 days each year, reaching more than 70 million US households through broadcast, cable, satellite and the Internet. In 1999, the company generated \$1.2 billion in sales, received more than 68 million sales and customer service calls, shipped more than 34 million packages and currently services a growing customer base of more than 5 million. Dave Aldridge describes his role as architect in aligning IT with HSN's transformation to a new commerce business model, and outlines specific challenges for CIOs charting an organization's strategic future.

10:30 am - 11:00 am **Coffee Break**

11:00 am - 12:30 pm **The New CIO**



Michael Earl
Professor of Information Management
London Business School

Based on a global survey of nearly 100 CIOs, Michael Earl has plotted substantial role changes for CIOs in recent years, and has identified even greater transformations to meet the challenges of the new economy. Earl describes these changes, analyzes the skills and experience required of the new CIO, and discusses executive time allocation. He suggests that the job of CIO as we know it may become too large and demanding for just one person to handle. He illustrates his presentation with data and examples gathered in the summer of 2000 from the US and Europe.

MONDAY, OCTOBER 16 (con't)

12:30 pm - 1:30 pm **Luncheon**

1:45 pm - 2:30 pm **Business Briefings: Brio, Cable & Wireless, Changepoint, Chordiant**

2:35 pm - 3:20 pm **Business Briefings: Citrix, E.piphany, EDS, Enterasys**

3:25 pm - 3:50 pm **Coffee Break**

3:55 pm - 4:40 pm **Business Briefings: Genuity, HP, IBM, IDC**

4:45 pm - 5:45 pm **Venture OnStage: What's Just Around the Corner?**

**Venture
OnStage**



Chris Lindquist - Moderator
Technology Editor
CIO Magazine

Be among the first to see hot new technologies, products and services! We're challenging the chief executives of five companies to tell us — in under ten minutes each — why their newest technology or service should give us greater expectations. The five finalists represent companies that have been through at least one round of financing, and whose product has been marketed for less than a year. They've already withstood a winnowing process by a jury of *CIO* magazine executives ... but are they ready for you? You be the judge.

5:45 pm - 7 pm **Reception**

7 pm - midnight **Hospitalities/Networking**

TUESDAY, OCTOBER 17

7:30 am - 8:30 am **Breakfast**

8:30 am - 9:30 am



Enabling Visions: The CEO-CIO Relationship

John J. Brennan

Chairman and CEO
The Vanguard Group

Robert DiStefano

Managing Director of Information Technology
The Vanguard Group

Businesses have a hierarchy of IT needs characterized by increasing complexity and risk. Every IT task can be categorized as one of three types: 1) automating the business; 2) expanding the business; or 3) reinventing the business. In each of these scenarios, the most difficult technology and business questions typically revolve around what to do, not how to do it. Chairman and CEO John J. Brennan and Robert DiStefano, Managing Director of Information Technology, will team up in this presentation to discuss strategic decision-making and the CEO-CIO relationship at The Vanguard Group, the world's second-largest mutual fund company. Brennan will discuss his vision for technological innovation at Vanguard, and DiStefano will outline how IT works with business to carry out that vision.

9:30 am - 10:30 am



The Role of the CIO at eSpeed

Sandy Goldstein

Senior Vice President and CIO
Airgas, Inc.

E-commerce is driving the corporate agenda, and changing the influence of the CIO in strategic planning, operations, customer relations and in the board room. Goldstein addresses the transformation of IS strategies to business and operating strategies; IS budgets to capital raising/P&L administration; human resources management to joint ventures/partnerships creation; and corporate navigation to corporate governance. He compares aligning information services with the business and customers; and information services driving business strategies for the new on-line economy. Goldstein and two Airgas customers offer strategies to communicate with and anticipate the needs/demands of increasingly complex workplaces and sophisticated on- and off-line customers.

10:30 am - 11 am **Coffee Break**

11 am - 11:50 am **Business Briefings: Information Builders, Intel, Intentia, Intira, Iomega**

Noon - 1 pm **Luncheon**

TUESDAY, OCTOBER 17 (con't)

1 pm - 2 pm

**Thoughtful Alignment and Local Entrepreneurship: A Business and IT Strategy****Harriet Edelman**Senior Vice President and CIO
Avon Products, Inc.

Avon, in its third century, operates in 135 countries through a direct sales force of 3,000,000. The business is undergoing a transition from a single to multi-channel world and overall transformation of a traditional business model. Avon is not post-ERP, so the challenge is to improve the fundamentals while quickly delivering customer-facing applications. Edelman outlines how to take a business strategy that is stated at a high level and drive the IT strategy to better align with it. Avon IT has a legacy of significant decentralization, so the plan going forward must be executed with greater alignment and coordination -- while preserving local entrepreneurship.

2 pm - 2:50 pm

Business Briefings: Kyocera Mita, Legato, Lockheed, Lucent, NetScout

3 pm - 3:50 pm

Business Briefings: Powerware, Prosight, Symantec, Xerox

3:50 pm - 4:15 pm

Coffee Break

4:15 pm - 5:45 pm

Cultural Capital and the New Frontier of Competitive Advantage: Tools for Measuring Your Culture and Mapping Your Values**Richard Barrett**Author, *Liberating the Corporate Soul: Building a Visionary Organization*

According to Barrett, the three biggest issues in business today are how to become more profitable; how to attract and keep the best people; and how to release new levels of employee creativity and productivity. All can be addressed by building cultural capital. Employees remain at organizations whose values and vision are in alignment with their own, whose leaders empower rather than exploit, and where they will feel a sense of community and ownership. A values-based culture that focuses on employee fulfillment is the number one attribute for success. To create such a culture, you need to manage and measure it.

5:45 pm - 6:45 pm

Reception with Richard Barrett

7 pm - midnight

Hospitalities/Networking

WEDNESDAY, OCTOBER 18

7:30 am - 8:15 am

Breakfast

8:15 am - 8:30 am

KnowPulse Poll Results**Abbie Lundberg**Editor in Chief
CIO Magazine

Lundberg will present the results of Monday morning's poll.

8:30 am - 10:30 am

Globalization and Corporate Strategy: What Every CIO Should Know**Jeffrey Garten**Dean and William S. Beinecke Professor in the Practice of International Trade and Finance
Yale School of Management
Author, *World View: Global Strategies for the New Economy*

Conducting business in the global arena entails planning and executing corporate strategies in revolutionary ways. Corporate leaders need to rethink every aspect of the company, the marketplace, and the competition. Using research from his recent book, and interviews with 40 of the world's top CEOs for his forthcoming book, Garten describes some of the key themes that have emerged. He also provides his personal evaluation of whether these strategies are up to the formidable challenges he sees ahead.

10:30 am - 11 am

Coffee Break

11 am - 11:30 am

Question & Answer Session with Jeffrey Garten

11:30 am - 11:45 am

Closing Remarks**Dr. Jim Wetherbe**

MONDAY, OCTOBER 16

1:45 pm - 2:30 pm

B2B Analytics: Transforming the Landscape of eBusiness



Katherine Glassey
CTO
Brio
Technology, Inc.

Companies require B2B analytics to measure and drive improved business performance. These analytics must be simple and intuitive, serving the needs of the individuals throughout an organization, addressing all relevant information sources.

Organizations must manage e-business effectively, responding to opportunities quickly and staying ahead of competitors. This requires business intelligence integrating business with traditional channels and partners, internal and external data, and strategic information with tactical data.

E-business analytics empower organizations to create and deliver shared, actionable information wherever it is required along the e-business value chain. Insight into your e-business using these analytics will separate the winners from the losers in the new e-economy.

Creating Partnerships: Innovative Approaches to Delivering E-Speed Customer Solutions



Robert Flood
CTO
Cable &
Wireless, Inc.

IP technology is driving e-business and changing the way we do business — and the way we support performance-driven customer strategies. Do shifting technologies require thinking about partnerships as an effective way to provide innovative approaches to

customer e-solutions? Flood explores what customers think about the need to deliver solutions globally as they look ahead to growing their business. Participants will look at what it takes to develop an effective partnership that's a win-win for all parties. He also describes some of the attributes of companies that make the best partners. Flood highlights a partnership case study and explains why was the partnership initiated, and the benefits and difficulties.

A Success Story: How Guardian Insurance Manages Their IT Like a Business

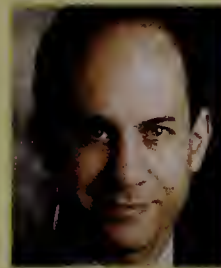
Joe Connell
Vice President, Information
Technology
Guardian Life Insurance
Company of America

Courtesy of Changepoint

Connell discusses Guardian's ongoing transformation of its IT department and its culture: how they are meeting the increasing and always-changing demand for advanced high-quality IT services with a limited number of dedicated resources; making client satisfaction a top priority for the IT department; providing IT business leadership in the organization; establishing IT metrics that enable for strategic planning, plus show the benefits of IT work throughout the business; and "professionalizing" IT — attracting and retaining high performers in IT, plus enhancing their career opportunities.

2:35 pm - 3:20 pm

Corporate Portals: Transforming the Desktop into a Doorway



David Weiss
Vice President
Marketing
Citrix Systems, Inc.

A corporation's voracious appetite for information — delivered quickly, efficiently and universally — is a given. The challenge facing CIOs is how best to feed this hunger. Traditional desktops, fat with installed applications and tools, are morphing into Web-based "doorways" to information stored elsewhere — in data warehouses, on company and ASP servers, and on the Web. Corporate portals promise greater productivity, ease of use and cost savings. But their success hinges on accessing all information, including existing applications, via a Web browser. A key enabler of the portal trend is new technology providing instant "Webification" of server-based applications. By accelerating Web enablement of existing solutions, this technology flings open the door to a new era in information access.

Capitalizing on The Digital Economy

Courtesy of EDS

CIOs are reinventing their enterprises. They're striving to meet the demands of continuous change, cope with the reality of unstable marketplaces, and respond to unpredictable sources of competition. How will you deliver creative strategies and superior expertise to meet these demands? How will your prospects become new customers? In this session, EDS will show you ways to turn these challenges into successes. By capitalizing on the digital economy, your company will be prepared to win against its toughest opponents.

3:55 pm - 4:40 pm

Successful IT Planning

Courtesy of IDC

Once companies set their corporate business directions, they begin to form a plan for information technology to support their goals. Done well, IT planning becomes a tapestry of mission statements, business objectives, and strategies. Increasingly, CIOs are faced with the challenge of creating IT plans that achieve business goals through technology innovation. To help CIOs with this challenge, IDC has created an IT planning approach that CIOs can customize and apply to create a business-focused strategic IT plan. Learn about this approach, along with an integral proven planning model for ranking and selecting the right IT strategies for investment. IDC's technology planning expert will also discuss how he has applied the approach to help other CIOs create successful IT plans.

TUESDAY, OCTOBER 17

11:00 am - 11:50 am

U. S. Bank and Information Builders: Building an Architecture for E-Business



Chris Clemens
*Vice President
Business
Architecture*
**U.S. Bank Electronic
Payment Systems**

Courtesy of Information Builders, Inc.

As the world's largest issuer of procurement cards, U.S. Bank is a critical enabler to e-commerce. Clemens explores how U.S. Bank is teaming with Information Builders to build an Internet-based commercial payment system to meet the demand for sophisticated

payment transactions for B2B e-commerce. Extending U. S. Bank's card management system to partners, this system will ultimately allow customers to analyze transactions as part of B2C and CRM initiatives. Information Builders' end-to-end solutions for business intelligence and enterprise integration enable customers like U.S. Bank to quickly and cost-effectively meet market challenges.

Building a Third Generation e-Business Data Center



Christopher S. Thomas
*Chief eMarketing
Strategist*
*IA Solutions
Channels Group*
Intel Corporation

The evolution of Internet Business is moving at a stunning pace. Is your company ready for the third generation of Internet Business? E-Business today is shifting the computing epicenter from the fortress of the traditional data center to the rough-and-tumble world of customer-facing systems and front-end web servers. And in this customer-centric world of the Third Generation, companies are creating not just supply chain linkages but entire lattices with automated, bi-directional rules-based links between numerous vendor systems and customer systems. So how can you build your company's business Internet systems and solutions to handle this new e-Business environment? Thomas examines the new technologies that will help you succeed in this new era.

The Balancing Act: E-Business & the Information Backbone



Ed Koepfler
President
Intentia Americas

Ice cream, furniture, personnel recruitment, and dairy businesses. What do they have in common? They figured out how to be profitable with e-business. What's their secret? They learned to leverage best practices and effective management approaches with the right information technology backbone to ensure success. Koepfler explores the strategies, implementation and payback of completing an enterprise infrastructure for the greatest impact on business and e-business.

The Future of Technology



Dana R. (Rick) Richardson
President
**Richardson Media &
Technologies**

Courtesy of Iomega Corporation

Rick Richardson provides participants with his vision of both our near and longer-term future as it relates to technologies important to the CIO and IT professional. Topics will include a review of last year's predictions, current trends in hardware, software and communications, and emerging technologies that will help bring those trends to reality. Richardson also discusses the future of removable storage and data transfer. Finally, he goes on the line with his forecasts of our technological future. Richardson will bring along some of the newest technologies to use in delivering his presentation.

TUESDAY, OCTOBER 17

2:00 pm - 2:50 pm

Kyocera Mita



Bob Sostilio
Director, Converging
Digital Peripherals
CAP Ventures

Courtesy of Kyocera Mita America, Inc.

Why are digital based copiers, facsimile transceivers and printers establishing higher penetration rates into the office space on a daily basis? Are these digital platforms restricted to specific work environments with specific functionality? Are they providing integration of functionality and creating higher workgroup productivity across the enterprise?

Come hear an industry expert's view on the trends of converging functionality and which manufacturers and resellers are delivering seamless integration of digital functionality.

Sending information to and from internal and external clients are challenges companies face today. Discover how clients view, store, edit and distribute data without being retrained on new technology or print drivers. Decide if office equipment manufacturers have developed true-life plug and play peripherals with standard user interfaces and common print drivers. You'll be sure to walk away with new insight, ideas and viewpoints on communicating more efficiently with internal and external clients.

**Information Continuance:
Information Wherever You Need It,
Whenever You Need It, On
Whatever Platform Is Required**

George Symons

Vice President, Product Development
Legato Systems, Inc.

It doesn't matter how complex your computing environment is, or how constrained you are by time, budget, and staffing. If you're an IT decision-maker today, you live and die by one metric: the availability of mission-critical information wherever it's needed, whenever it's needed, on whatever platform is required.

This is called "information continuance," and it is an essential goal for any enterprise in an e-commerce, multi-platform world. Achieving information continuance demands a range of solutions that tackle three fundamental tasks: protecting information; moving information; and managing information.

Symons discusses how businesses must protect, move, and manage data across the enterprise if they are going to succeed in leveraging their information assets and adding value for their customers.

Getting the Risk Out of E-Business

Courtesy of Lockheed Martin

The Internet is profoundly changing the way business is conducted. The "hidden" e-Business imperative is that Internet transactions can't be allowed to put your company, vendors, employees, customers and others at risk. What's needed is rock-solid planning and bulletproof IT infrastructure to maximize Net profit and minimize risk. Industry experts will talk about balancing risk and reward and lessons in building an e-Business-ready infrastructure. Participants are encouraged to take a broad view of the transformation of business into e-Business. Business models and processes, applications, and technology infrastructure

are all deeply affected by this transformation. Its impact and the associated risks need to be clearly understood and managed in order to make the most of the opportunity. This briefing will be followed by a roundtable discussion with the experts.

**Keys to the Virtual eBusiness
Enterprise: Communication-
enabled Portals Delivered by CIOs
as Enterprise Service Providers**



Martin F. Parker
Vice President
Strategy and
Portfolio Planning
AVAYA
Communication

The virtual enterprise is the operating paradigm for eBusiness, with each enterprise creating its best core value proposition through networked combinations of suppliers, partners and employees and then presenting these capabilities to customers through global networks. One key to success is powerful, consistent communication links throughout the virtual enterprise.

Communication-enabled Portals are the optimum vehicles for these linkages, facilitating long-term, high-value business relationships through both human and system interactions. Another key is the orchestration of eBusiness service delivery to the virtual enterprise, where CIOs and their teams may emerge as "Enterprise Service Providers," delivering a modular blend of both internally-produced and externally-sourced eBusiness services. Parker discusses opportunities for engagement and exploitation in these two key areas of eBusiness.

3:00 pm - 3:50 pm

CIO As Strategist: How ITM placed A CIO at the Strategy Table



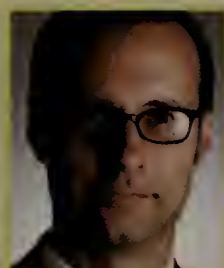
Walter Weir
CIO
University of
Nebraska



John Cimral
CEO
ProSight, Inc.

The challenge of managing and meeting the expectations of all IT stakeholders is a constant battle for CIOs. Go from the private to the public sector, and these challenges are compounded. Imagine the University of Nebraska, a \$1.3 billion public institution, balancing the needs of faculty, administration, students, academic leadership AND the public. Examine how they communicate the carefully scrutinized consumption of tax dollars and demonstrate the value returned from almost \$100 million spent on IT each year. Walter Weir explains how he put an IT Management (ITM) system in place to communicate in a common business language across the institution, and ensure the alignment of IT spending with the University's objectives. More importantly, this system allows Weir to position IT as the driver of overall organizational strategy, rather than the other way around.

Network Security: Past and Present



Cress Carter
Vice President, North
America Enterprise
Sales and Marketing
**Symantec
Corporation**

In the 1960's and 1970's, network security was a matter of "gates, guns, and guards," where security could be maintained by simply

preventing intruders from physically breaking into a facility.

In the 1980's and early 1990's, the "find and fix" approach took hold as technologies such as client/server computing and the Internet fueled new, more complex security challenges. As one company after another fell victim to a variety of security threats, commercial software providers responded with products targeted at individual areas of concern.

Today, IT professionals are beginning to realize that maintaining security requires more than simply locking one door at a time. Instead, they are challenged to minimize security risks at all points across the enterprise — a daunting task considering the labyrinth of applications and hardware involved.

Enterprise Success: A Case Study

Courtesy of Xerox Corporation

In partnership with one of their leading customers, Xerox showcases innovative industry-focused solutions and services that help CIOs improve key processes and resolve today's business problems. By combining global capabilities and world-class partners from information technology, document management and knowledge sharing, the presenter offers solutions to help customers become more efficient while anticipating and responding to future market changes and opportunities.

Business briefings will also be presented by:

Chordiant Software, Inc.
Enterasys
E.piphany, Inc.
Genuity
Hewlett-Packard Company
IBM Corporation
Intira Corporation
NetScout Systems, Inc.
Powerware

Venture OnStage



NEW! Venture OnStage: Are These Entrepreneurs Ready for Prime Time?

For this conference, we've added a new feature that will generate more excitement — and probably plenty of heated discussion: Venture OnStage!

Our esteemed jury of *CIO* magazine executives has weighed the merits of submissions from companies who think they have hit upon "the next blockbuster idea." In order to qualify, these companies have been through at least one round of financing, and have marketed their product, service or technology for less than a year.

We've winnowed the hopefuls down to five finalists, and we're challenging their chief executives to convince us — in under ten minutes each — why their newest technology or service should indeed give us greater expectations. You get the chance to pepper them with questions, and decide whether or not they are ready for prime time.



hosts

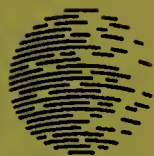


AVAYA Communication, formerly the Enterprise Networks Group of Lucent Technologies, is a leading provider of communications and networking technology for businesses, with a customer base that includes 90 percent of the Fortune 500. We provide a full array of business communications solutions — including service and support functions — for voice and data networks, customer relationship management and call centers, and messaging. AVAYA Communication will be the worldwide leader in messaging and call centers and the U.S. leader in voice communications systems for both large and small businesses.



Brio Technology, Inc. is the only business intelligence software provider to offer a complete, integrated analytic infrastructure that addresses the decision-making needs of today's e-business/business to business world. The Brio ONE solution — including Brio. Enterprise, Brio.Report, Brio.Portals, and Brio.Applications — enables organizations to build and deliver business intelligence, enterprise reporting, and analytic applications to users in Intranet, extranet, and hosted application environments, all with unmatched ease of experience and scalability.

Contact Brio at 1-800-879-BRIO, or at www.brio.com.



CABLE & WIRELESS

With customers in 70 countries, **Cable & Wireless** is a major global telecommunications business offering a range of services spanning broadband data and Internet, fixed and mobile voice, as well as interactive entertainment and information.

Cable & Wireless' priority for expansion is the fast growing market of data and IP (Internet Protocol) services for business customers. It is making major investments in developing advanced networks and services in the United States, Europe and the Asia Pacific region to build the world's leading global IP infrastructure. With the capacity of this advanced infrastructure and its presence in key business markets, Cable & Wireless holds a unique position in terms of global coverage and services to business customers.



Changepoint Corporation

IT executives are making intelligent and profitable informed strategic business decisions — all while reducing their administrative and resource costs. Changepoint for Enterprise IT is a fully integrated corporate IT management software solution that empowers IT executives to centrally deploy, manage and measure time, costs, skills and productivity of both

internal resources and external contractors. Prepare your corporate IT initiatives with an end-to-end view of the entire IT services supply chain. Visit us at www.changepoint.com.



Chordiant Software builds customer relationship management applications tailored for business-to-consumer companies, serving traditional and e-business environments, with a single view of the consumer.

Unlike Web-only and customer relationship point solutions, Chordiant's flagship product, Chordiant CCS — Customer Communications Solution — embraces new customer communications methods while leveraging existing ones.

Chordiant unifies Web, branch and call centers through a single customer model that integrates all services, offerings and business goals. As a result, Chordiant allows enterprises to retain customers and grow revenue by enabling more sophisticated relationships.



Citrix Systems, Inc. is a global leader in application server software and services that offer "Digital Independence™" — the ability to run any application on any device over any connection, wireless to Web.

Citrix's solutions enable organizations to reach more users, with more applications, in more locations — and achieve this with greater speed and predictability, and lower costs. Founded in 1989, Citrix is one of the world's fastest-growing software companies, with more than 100,000 customers worldwide, including every one of the FORTUNE 100 firms. Its products, including MetaFrame™ software and Independent Computing Architecture (ICA), have been widely adopted by the corporate mainstream to achieve key business goals.



EDS is a professional services firm that applies consulting, information and technology in innovative ways to enable clients to improve their overall performance.

Through an "end-to-end" portfolio of services that includes all aspects of electronic business, EDS is the provider of choice for thousands of leading businesses and governments around the globe. EDS' business is making clients more successful. The company works with its clients to extend their enterprises and catapult them ahead of the competition. It provides thought leadership and creates measurable value by unleashing the full potential of information and technology.

For more information about EDS, please visit www.eds.com.

ENTERASYS NETWORKS™

Enterasys Networks provides powerful and intelligent infrastructure solutions for today's Global 2000 enterprise customers. By optimizing its solutions to support converged voice, video and data resources, Enterasys builds a solid end-to-end foundation for the seamless deployment of emerging e-business applications.

Flexible and highly manageable, Enterasys solutions scale to meet changing customer demands while protecting investments and lowering cost of ownership. With industry-proven technology, strategic partnerships and 24 x 7 worldwide support, Enterasys delivers maximum competitive advantage through the communications infrastructure.

For more information, visit us on the Web at www.enterasys.com.



E.piphany is the leading provider of intelligent customer interaction software for the customer economy. Delivering an integrated solution combining insight and action software products, E.piphany's Web-based analytic and operational CRM portfolio provides global business with a single, enterprise-wide view of each customer, to better understand and proactively respond in real-time to customer and market opportunities. Through feature-rich E.piphany products, including the E.4 System,

all inbound and outbound sales, service and marketing interactions are unified through multi-channel customer touchpoints and rich analytics. E.piphany serves the industry-leading enterprises in e-commerce, financial services, communications, consumer-packaged goods and technology.

GENUITY

Genuity Inc. is a leading facilities-based provider of high quality, managed Internet infrastructure services to enterprises and service providers. Genuity offers a comprehensive suite of managed Internet infrastructure services, including: Internet access through dial-up, dedicated and digital subscriber lines; Web hosting and content delivery; and value-added e-business services such as virtual private networks (VPNs), security services and voice-over-Internet Protocol. With extensive IP experience, the company integrates its suite of services into corporate networks and delivers high-performance, secure and scalable infrastructure services for conducting business on the Internet. Visit Genuity at www.genuity.com.

hosts



i n v e n t

Hewlett-Packard Company (HP) is a leading global provider of computing and imaging solutions and services for business and home. HP capitalizes on the opportunities of the Internet and the proliferation of electronic services. We are the second-largest computer supplier in the world, with 83,200 employees worldwide and revenue from continuing operations of \$42.4 billion in the 1999 fiscal year.

HP is extending its leadership in enterprise computing to the Internet marketplace, specifically in the areas of e-services and digital imaging. HP will enable the vision of e-services via partnerships and ventures of its own in the areas of apps-on-tap, which is pay-as-you-go software, and e-service portals.



IBM has introduced the world's most powerful Intel-based server, the 64-processor NUMA-Q E410, along with the industry's most affordable technology-leading two-way server, the Netfinity 3500 M20. These products represent the high-end and the low-end of the industry's most scalable Intel-based server line for e-business running Windows 2000 and Linux environments. Visit our Web site at www.ibm.com/servers/.



IDC is a leader in delivering reliable and insightful IT data, analysis, and opinions to enable organizations to successfully participate in the Internet economy. Founded in 1964, this worldwide company employs more than 650 industry analysts who cover a broad spectrum of technology and management areas. IT professionals and executives rely on IDC's research and advisory services for clarification, validation, and guidance in their tactical and strategic IT decision making.

Let IDC help you realize maximum value and ROI from the dollars you spend applying IT to business strategy.

Visit IDC's Web site at www.idc.com/itadvisor or call 1-800-343-4952 ext. 4773 for more information.



Information Builders helps organizations grow their businesses through the power of information. Its i-business software solutions combine data integration and business intelligence, giving people the ability to access and share real-time information over the Internet. Headquartered in New York City, Information Builders is one of the largest independently owned software companies in the world with more than 5,000 customer sites, including 92 of the top 100 corporations, currently using its technologies.



For over three decades, **Intel Corporation** has developed technology enabling the computer and Internet revolution that has changed the world. Intel is at the forefront as a primary building block supplier for the Internet economy. Today, companies incorporate Intel architecture-based solutions across their connected business and IT environments to create successful e-Business infrastructures: from Internet servers to data center systems, desktops to workstations, and laptops to network PCs and online services. For more information on Intel and its role in e-Business, visit us on the Web at www.intel.com/eBusiness.



Intentia International is one of the world's leading suppliers of Enterprise Applications to companies that manufacture products in discrete and process environments. Intentia is an ISO 9000 certified software developer and worldwide IBM development partner for the IBM AS/400. Our Enterprise Application, Movex, is designed to improve the underlying business processes within distribution and manufacturing companies, in the areas of logistics, production, distribution and finance. Available in 24 languages, Movex is implemented in more than 4,000 sites worldwide.

For more information, please call
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Intira Corporation is a provider of Netsourcing — the outsourcing of the complex IT and network infrastructure required to support mission-critical e-business applications. Intira Netsourcing Solutions incorporate highly skilled technical resources, highly automated operations, a suite of value-added services, and a seamlessly integrated world-class infrastructure — Enterprise-Class Data Centers and superior-quality broadband network — operationally controlled by state-of-the-art Service Management Centers. Intira's comprehensive Service Level Agreements ensure application availability up to 99.95 percent, while the OneSource-OneCall customer support program provides a single point of accountability.

Customers include Fortune 1000 organizations, dot.com companies, ASPs, and ISVs that depend on the availability of their mission-critical e-business applications. Visit Intira at www.intira.com, or call 888-326-3638.



Invensys Power Systems—secure power, ensures critical business uptime with its industry-leading UPS hardware, innovative software and global services for total power management solutions. Invensys Secure Power's comprehensive product offerings deliver high-level systems availability to a broad range of applications — from e-business to global networks, ISPs, industrial and communications equipment. Because when your systems aren't up and running, your business halts.

Invensys Secure Power is comprised of the leading brands, Powerware, Best Power and IPM. For more information, visit our Web site at www.invensys-power.com.



Iomega Corporation, a leader in smart, portable storage solutions, manufactures and markets the award-winning Zip®, Jaz® and Klik!® drives and disks and markets the ZipCD® CD-RW drives and discs that help mobile and desktop users in business, government and education to organize, manage, create, exchange and share their important information. Iomega Corporation can be reached at 800 MY-STUFF (800 697-8833), or on the Web at www.iomega.com.



Kyocera Mita America, Inc., is a leader in digital document imaging. As part of the \$7.5 billion Kyocera Corporation, KMA is known for developing economical, ecologically sound print engines, state of the art controllers and network tools plus years of innovation in copier technologies, paper handling and manufacturing experience. The product line includes network ready computer connectable digital printers, printer/copiers, color printer/copiers, multifunctional and wide format imaging solutions. For more information, visit www.kyoceramita.com.



Legato Systems, Inc., is a worldwide leader in the enterprise storage management software market. Helping companies leverage business-critical corporate data assets, Legato's products and services enable information continuance, a seamless approach to the movement, management and protection of data throughout an enterprise. Founded in 1988, Legato's storage management software products have become the recognized industry standard with the largest installed base representing over 60,000 customers.



LOCKHEED MARTIN

Integrated Business Solutions Company, headquartered in Orlando, FL, is the commercial IT services arm of the **Lockheed Martin Corporation**. IBS is an international IT services provider that partners with customers for IT outsourcing, e-business solutions, enterprise systems integration, and technology training solutions. Lockheed Martin is a global enterprise principally engaged in the research, design, development, manufacture and integration of advanced-technology systems, products and services. For more information about Integrated Business Solutions, visit our web site at www.ibs-lmco.com.



NetScout.

Because the network is the business.™

NetScout Systems, Inc.

(Nasdaq:NTCT) is a leading provider of network and application performance management solutions. NetScout's solutions ensure e-business applications stay up and running at optimum performance through real-time, system-wide visibility and actionable information for fault isolation.

NetScout's unique Application Flow Management (AFM) technology collects and presents the rich set

of application and Web traffic information via NetScout's application-aware instrumentation and reporting and analysis software. Further information is available at www.netscout.com.



ProSight

ProSight, the leader in IT Management (ITM), is equipping IT organizations with the first of its kind IT Management application, enabling CIOs to:

- **Align** IT spending with key business objectives
- **Communicate** across the enterprise in a common business language
- **Measure** IT effectiveness and efficiency through key performance indicators

With ProSight, IT organizations accelerate time to market, lower project failure rates, improve customer satisfaction and develop strategies that support key business objectives. Productivity is increased as IT management activities are automated, and the entire team has instant access to job critical information from a single source. Visit us at www.prosight.com.

SYMANTEC.

Symantec, a world leader in Internet security technology, provides a broad range of content and network security solutions to individuals and companies. The company is a leading provider of virus protection, risk management, Internet content and e-mail filtering, and mobile code detection technologies to enterprise customers. Headquartered in Cupertino, CA, Symantec has worldwide operations in more than 24 countries. For more information please visit www.symantec.com.

XEROX

Xerox Corporation is the leader in the worldwide document market, providing solutions that enhance customer productivity. Xerox' solutions and systems are designed to help offices around the world capture, share and use knowledge. The company has unparalleled expertise in the document space — both paper and electronic — and provides industry-specific, global document solutions, based on its hardware, software, network and consulting services.

Xerox is the only document services provider with a global sales, service and manufacturing capability. The \$19 billion company is headquartered in Stamford, CT. For more information, visit www.xerox.com.

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Guests may try a leisurely outdoor game of lawn chess or croquet, or challenge the club pro on one of the resort's seven tennis courts. Others may choose a different way to enjoy the surroundings...from a golf cart. A myriad of biking and hiking trails, or the state-of-the-art workout facilities, provides the ultimate in exercise or pamper yourself in the 22,000 sq. ft. European Spa.



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October 15-18, 2000
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WHAT IS YOUR INDUSTRY? _____

WHAT ARE YOUR ORGANIZATION'S ANNUAL REVENUES OR ASSETS? _____

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HOTEL ACCOMMODATIONS - We urge you to make your reservations early by calling the hotel at 602 955-6600 ext. 5400 and identifying yourself as part of the **CIO** conference to receive the conference rate. **CIO will make hotel reservations for government/military participants only.** Be sure to guarantee your room with a credit card, as all unreserved or unguaranteed rooms will be released on September 8, 2000. Hotel reservations, cancellations and charges are your responsibility. If a **CIO** conference Enrollment Form is not received within 48 hours of making your hotel reservation, your room will be released from the **CIO** room block.

ENROLLMENT FEES - All enrollment fees must be paid in advance of the meeting. Fee includes conference sessions, business briefings, Corporate Host displays, conference materials, scheduled meals, receptions and entertainment. Transportation, hotel and recreation are your responsibility. **Please note that submission of this enrollment form to CIO obligates the attendee/sender for the enrollment fee.**

CANCELLATION - ALL CANCELLATIONS OR SUBSTITUTIONS MUST BE MADE IN WRITING. You may cancel your conference or companion enrollment up to September 15, 2000 without penalty. A \$250 administration fee will be imposed for cancellations received between September 16 - September 29, 2000. **No refund or credit will be given for cancellations after September 29, 2000 or for no shows.** You may send a substitute in your place. **CIO** reserves the right to decline enrollment to any registrant.

If this is your first CIO conference, your business card is required in order to process registration.

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This fee applies if you are a CIO, IS executive or hold another executive position other than those listed below.
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- ☐ **SALES/MARKETING/CONSULTING = \$10,000**
This fee applies if you hold a sales, marketing, new business development or consulting position, including executive management of IT vendor and consulting companies. This fee is payable by company check only. **CIO** will make the final determination of this category.
- ☐ **COMPANION PROGRAM = \$325**
Companions must be enrolled in this program to attend any conference-related functions. Includes all scheduled meals, receptions, entertainment, companion breakfast, a stretch and tone class, and planned companion activities. Conference session attendance is not included.

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GRAND EXPECTATIONS

The CIO and Corporate Strategy

- Develop Enterprise Leadership Knowledge
- Influence Corporate Direction
- Affect Real Change
- Anticipate Challenges



home shopping network

BY
SUSANNAH
PATTON

In the old days, realtors held the keys to a massive database of property listings. Then the Web came along, shifting power to consumers and reshaping the industry.

She's impeccably dressed in a blazer and pumps. With a smile frozen on her face, she guides you through yet another charming home, shrugging slightly as you point out the cracked foundation. If you don't like this one, she'll jot down your phone number and haunt you until you buckle under the pressure.

This ugly caricature has no place in Mollie Wasserman's home office, nestled on a quiet street in Medway, Mass. No pushy, face-to-face sales tactics here. Instead, a relaxed Wasserman settles down at her computer on a sunny April morning and checks e-mail from prospective buyers. She encourages clients to visit her custom-designed website and sends them instant e-mails when a new property comes on the market.



Wasserman represents a new breed of realtor, one who uses the Internet to connect with and better serve clients. While Wasserman is an enthusiastic convert to technology—70 percent of her \$6 million in gross sales in 1999 came from her website—other realtors are decidedly less welcoming of the idea. Among their chief misgivings, they fear that the Internet—with its ability to distribute information to buyers that was formerly proprietary to realtors—will chip away at their traditional 6 percent commissions or leave them behind entirely.

Yet realtors, who are 52 years old on average, can no longer ignore the Web if they want to keep up with the younger house-buying set.

While close to 40 percent of home buyers now start their search online, only 1 percent of the nation's realtors generated more than 20 percent of their business online last year, according to the National Association of Realtors (NAR), a trade group based in Chicago. Furthermore, dotcom startups offering discount commissions are sprouting up, adding a new layer of competition to an already crowded field.

Global giants such as Re/Max International and Cendant Corp. are holding on to dominant positions even as the dotcoms nip at their heels in a strong market. These companies are frantically jumping on the Internet bandwagon in order to preserve their brands, pushing

their agents to use technology and, in some cases, starting their own dotcoms. To arm its forces, the NAR recently kicked off a technology certification program for realtors, called ePro. And a new breed of real-estate startups are developing transaction technologies that will help agents and franchisers streamline the home-buying and selling process by putting the entire deal online, from 'click to close.'

The Web is shaking the residential real-estate industry to its foundation by tearing down the wall of secrecy surrounding the Multiple Listing Service (MLS), the nationwide network of property listings that was closed to the public for decades. Industry observers predict that as many as two-thirds of the country's realtors could soon fall by the wayside as home buyers and sellers increasingly turn to the Web instead of their agents for property listings, mortgage calculations and neighborhood crime reports. But unlike the travel or insurance businesses, where the Internet has been slaying the middlemen in droves, Wasserman is convinced that she'll survive. She and other realtors like her are betting that most consumers would rather turn to a realtor than a website when an inspection goes wrong or a deal goes haywire. And real-estate professionals are finding that customers still want a hand to hold when they're forking over their life's savings. "Buying a home is emotional," says Kristi Graning, vice president for Web services and IT marketing at Re/Max, a real-estate franchiser based in Englewood, Colo. "It's a dream, and it's personal. You need the human element."

A Crowded House

Thousands of dotcom startups and national real-estate sites have emerged over the past year to offer listings, virtual tours and mortgage calculators, giving consumers more control and increasing effi-





LET MILLIONS OF PEOPLE INTO YOUR BUSINESS SYSTEMS SECURELY.

The challenge for B2B electronic business isn't just keeping the bad guys out, it's letting the good guys in. Basic security technology works up to a point, but what happens when you have millions of users visiting your back office systems daily? Secure Computing delivers safe, secure extranets for your growing e-business needs. As your extranet channels grow, so will your level of protection.

Give your partners the green light. With Secure Computing you have world-class e-security solutions today, as well as scalability for tomorrow. For more information, visit our Web site today. www.securecomputing.com

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ciency in an industry once ruled by lockboxes and the old-fashioned sales pitch. Consumers going to the Internet to browse are now, in a few cases, even bidding for homes online.

Robert Moles, president and CEO of the national franchise Century 21 Real Estate Corp., based in Parsippany, N.J., says real-estate professionals will have to use technology to boost customer loyalty in order to survive. Because customers can now get so much information online, Moles says, they are going to expect more from their realtors, who in turn must expand their offerings to include helping connect power and gas utilities and providing crucial information about a new neighborhood. "This change is fundamental, cataclysmic, and it's not going away," says Moles, a 25-year veteran of the real-estate business. "The people who are able to adapt, to redefine the value equation for the consumer—those are the survivors in residential real estate, whether a big company or individual realtor."

Many industries, most notably travel, insurance and financial services, are weathering similar storms as consumers question the need for high commissions when online sites promise a wide array of services. In theory, it should be feasible to buy a home online, even if the transaction is a bit more complicated than ordering a book from Amazon.com. In practice, however, it's much harder to turn a home into a commodity. (How many other purchases can literally make people weep?) If a man's home is his castle, buying or selling one can be like crossing a shark-filled moat.

For decades, realtors had exclusive access to listings, while customers groped blindly for information. Buyers and sellers signed dozens of forms—and continue to do so—entrusting their largest investment to a battalion of agents and lawyers. National real-estate companies consolidated and flourished by building an army of realtors wielding information like clubs over an ill-informed public. Then, in the mid-1990s, something dramatic happened: The NAR put home listings online, making the information available to customers for the first time on its Realtor.com site.

With MLS listings online, entrepreneurs began following the NAR over to the Web. Hans Koch was a pioneer when he started Owners.com in 1995 for sellers who wanted to go it alone. Homeowners who want to avoid the standard 6 percent commission can list their property on the site and select from marketing and transaction packages that include virtual tours, signage and appraisals. At the same time, Realtor.com expanded its listings, putting together 95 percent of the MLS's million-plus listings in the United States and Canada, allowing customers to narrow their searches before contacting agents. Hundreds of others, including Microsoft's HomeAdvisor Technologies,

Follow the **mOney**

MEDIAN HOME PRICE PAID BY A WEB SHOPPER: **\$138,000**

MEDIAN HOME PRICE PAID BY A NON-WEB SHOPPER: **\$120,000**

MEDIAN INCOME OF WEB SHOPPER: **\$69,900**

MEDIAN INCOME OF NON-WEB SHOPPER: **\$55,800**

SOURCE: NATIONAL ASSOCIATION OF REALTORS

HomeSeekers.com and Homes.com have since followed suit.

One consumer sold on the Web is Amy Lopez of White Plains, N.Y. "If you want to be an informed customer these days, you just have to use the Internet," says Lopez, who took advantage of the plethora of online real-estate sites when she and her husband decided to sell their home in March. "In my experience, realtors have the tendency to be pushy, so I decided to do the work myself," says Lopez,

who was preparing to move her family to Syracuse, N.Y., over the summer. After perusing Realtor.com to compare home prices, she posted ads for her house on several sites, including Owners.com. Two-and-a-half weeks later, the Lopez family accepted an offer from a woman who saw the ad on Owners.com for \$280,000, \$5,000 above the asking price.

Lopez acknowledges that realtors can still be useful for those moving to new cities or neighborhoods, although she won't need one because she is planning to rent in Syracuse. And she admits that not everyone wants to market their own home. That's music to the ears of full-service realtors. Brad Inman, a former real-estate journalist

whose HomeGain.com allows sellers to screen agents online, argues that realtors provide valuable services for the majority, who don't have the time or inclination to sell their own home. "Selling your own home is great for the 15 percent of people who build model airplanes or give birth at home," Inman says. "But most of us don't want that. We want a professional." And the national franchises are offering extra services online to make the moving process easier. For example, Coldwell Banker Real Estate Corp.'s website features a concierge service that will help you arrange to have your new house painted and petunias planted before you move in. Owners.com recently added an Owner's Agent service that will match the buyer or seller with an agent and result in a rebate of part of the costs of the home sale.

Despite new competition, the offline real-estate leaders say they're going strong, even though most don't share revenue information.



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Re/Max, which is privately held, reported more than 1.2 million transactions last year, up from 1 million in 1997. This success reflects, in part at least, a booming real-estate market. When times get tough again, real-estate professionals predict they will need the Web even more to attract valued customers.

Meanwhile, dotcoms have challenges of their own. The same problems that plague traditional realtors are showing up online. Out-of-date information, poor or nonexistent photos and property descriptions that can best be described as “creative,” are just as likely to be found on a dotcom as on the listing sheets offered by traditional realtors. While many sites are beefing up their offerings with

online loan processing and home improvement tips, many offer less information than the Sunday newspaper listings.

And though a host of sites offer MLS listings, the NAR has joined with eBay in a fight to protect databases from copyright infringement. The NAR hopes Congress will pass a bill that would carry criminal penalties for anyone violating the rights of the original gatherer of information—in this case, the realtor. “The realtor is the one who is putting the listing and photo together,” says Dennis Cronk, the NAR’s president, noting that local associations make the decision whether to allow an Internet site to post their listings, created exclusively by realtors. “Pirates are extracting data they want and marketing that content. We want to see the Internet grow, but I’m deeply concerned that realtors may cease to make information available.”

Traditionals Fight Back

Dressed in army fatigues, Re/Max cofounder and chairman Dave Liniger stood before the microphone and addressed his soldiers, thousands of Re/Max agents and brokers who came to hear him speak about the “Real-Estate Wars” at the company’s February convention in Las Vegas. “The new armies are the dotcoms....They’ve got more money than they’ve got brains,” Liniger said as he swaggered across the stage. “The real question we have is, are these new companies allies or armies that are enemies of ours?”

Liniger has observed the transformation of the residential real-estate industry over three decades, as agents have exchanged answering services for cell phones and e-mail. He sees, as other national leaders do, that in order to survive, his agents, and Re/Max as a whole, need to transform themselves to serve a younger public before new startups take his

business and erode his brand. “The battlefield conditions are chaotic, but not for the smart people,” he said. “If you’re not embracing technology and using it in every aspect, you’re going to be retiring soon.”

As Liniger rallies his troops, his CTO and Web services staff are busy working on technology strategies that will encourage Re/Max agents to get online. Like its competitors, Re/Max’s website offers property search, mortgage rates, home repair services and home-buying tips similar to dotcoms. But even before the Internet rush, Re/Max had set up an online forum with Compuserve in the early ’90s. That forum became Mainstreet, an extranet that now links about one-third of its 60,000 agents and provides them tips on how

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to download, upload and build a personal website. Mainstreet will move to an extensible markup language (XML) platform over the next 12 to 18 months, says Re/Max CTO Bruce Benham. That will allow the company to share data with business partners to find out more quickly which houses are on the market and provide instant messaging capabilities so that agents can share information.

Century 21 also has an intranet for brokers and sales associates and is part of parent Cendant's year-old global referral network. An Internet-based transaction reporting system automatically posts listings online, and the company is working on a project to launch back-office management tools that will help integrate the often fragmented business. The goal is to secure customer referrals online and offer services that will keep them coming back. "The push for change is coming from the consumer," says CEO Moles, noting that the younger Web-focused home buyers and sellers want more information quickly as well as good service.

"We want to use technology to do a better job and create customers for life."

Traditional companies and franchisers, including Cendant and the smaller Keller Williams Realty, based in Austin, Texas, are also launching their own dotcoms. "I believe in the Internet," says Gary Keller, founder and chairman of the realty agency, who expects that all of his company's 5,800 agents will have e-mail and a personal website by the end of the year. But Keller considers most current online sites useless because the transaction isn't yet on the Web. He was involved in the creation and recent launch of a separate company, Homesbyauction.com, that allows registered agents to auction homes over the Internet.

Getting Up-to-Speed

Doing business at Internet speed won't be easy for an industry traditionally behind the technological curve. In 1995, when Wasserman was building her personal website as an agent for a national franchise, the only comment she got from her supervisor was: "Stop playing with computers and go sell houses." What's more, most MLS databases are operated as individual fiefdoms with no common standard for exchanging property listing information. "EDI standards for manufacturing have been around for years, but we have nothing," Re/Max's Benham notes. Without common standards, realtors from different states have been unable to exchange information electronically. For example, the MLS in California might display data in a different way than its counterpart in Colorado; a realtor from California would have a hard time helping a client moving to the Rocky Mountain state.

TrOuble in the CyberhOOd

Venture capitalists have poured millions into real-estate websites over the past year, but the startups are still hemorrhaging money from heavy spending on marketing and advertising. Most are privately held and don't release financial information, but those that have gone public show steep losses.

HomeSeekers.com, which features 850,000 listings and also hosts agent websites, said its net cash loss increased to \$3.5 million for the quarter ended Dec. 31, 1999, compared with a loss of \$500,000 for the same period a year earlier. Homestore.com lost \$29.2 million in the first quarter ended March 31, compared with a \$27.4 million loss a year earlier.

"Very few models have figured out a way to generate positive earnings on a long-term basis," says Nick Karris, a real-estate analyst at Gomez Advisors in Lincoln, Mass. "There is more and more competition, and the cost for attracting and retaining the consumer is going up."

But don't expect these sites to roll over and die. HomeSeekers.com said consumer traffic to its website reached all-time highs during the December quarter, a promising sign as the company tries to boost brand awareness. Jim J. Fowler, a senior research analyst at Thomas Weisel Partners in San Francisco, describes Homestore.com as a durable model because of its wide coverage in national listings. With at least twice as many property listings as its nearest competitor, Homestore.com is well positioned to capture a good share of the industry's estimated \$200 billion in marketing and e-commerce revenues, Fowler says.

As weaker dotcoms flounder, however, analysts predict a consolidation as industry leaders harvest the best of new technologies. "Companies with established brand names, many of whom have offline presences, will be buying up the Internet pure plays," predicts Karris.

—S. Patton



WITHOUT COMMON
STANDARDS, REALTORS
FROM DIFFERENT
STATES HAVE BEEN
UNABLE TO EXCHANGE
INFORMATION
ELECTRONICALLY.

Over the next few years, industry players expect to see an XML-based standard for the exchange of property title, mortgage and ancillary services such as insurance and relocation assistance. And as the NAR prepares to push its ePro program, 5,000 realtors have already signed up for the online course designed to teach them how to use the Internet to market property, capture buyers and develop webpages.

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Agent Survival

The Internet is putting increasing pressure on realtors' standard commissions, as online sites offering lower rates tempt buyers and sellers. And while many realtors may soon be running screaming from the room, new technologies are being developed that, paradoxically, will help some of them survive in the Internet age by enhancing the services they offer to home buyers.

HomeAdvisor Technologies and Homestore.com have developed transaction management tools that allow agents and their clients to track via the Web the multiple steps of the sales process in real-time. (While Microsoft offers its own real-estate site, its technology is

becoming available to realtors.) One of those angling for market share in transaction management is iProperty, a Bloomington, Ind.-based startup that's rolled out Chorus, a transaction management product.

Beta-tested by 400 Indiana realtors earlier this year, Chorus allows professionals to set up custom pages for each buyer or seller within an agency's website. Customers can then view homes, apply for mortgages and order inspection services, all the while checking on the status of their transaction day or night. All parties involved would be able to track the process until they arrive at a "virtual closing," shaving weeks off of a typical closing process. Using

Chorus, the realtor can become a "home services agent," establishing a relationship with a customer that will continue even after the sale by providing them with additional services such as home value tracking or tips on when to refinance, according to Ari Vidali, iProperty's technology evangelist.

Another B2B contender, Homebid.com, based in Scottsdale, Ariz., is offering to host websites for traditional brokerages and is developing applications for auctioning properties online. All of these technology providers are hoping legislation recently legalizing the digital signature passed by Congress will further speed up transactions. (President Clinton has since signed the legislation.)

Surrounded by her two digital cameras and a high-speed laser color printer, Wasserman sits at her computer in her home office and works at serving her customers. She clicks on an e-mail from a woman looking for a one-bedroom condo that will accept a pet and immediately creates an online action plan, insuring the new client will receive regular new listing updates by e-mail and regular mail. By signing on with Wasserman, this new client will have direct access to MLS listings, which contain town, address and price range information.

Though the realtor's role and traditional commission structure are bound to change, industry observers agree with Wasserman that the good agents aren't going away. "Technology gives me the time and ability to serve my customers well," Wasserman says. "But in the end, I have confidence people will always need me." **CIO**

Having just bought a house, Senior Writer Susannah Patton hopes that pushy realtors become relics of the past. Send your thoughts to spatton@cio.com.



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Nikki Stange, data crisis counselor at DriveSavers, is a lifeline for the company's most frantic customers.

Nikki Stange combines the human touch she gained as a suicide hotline attendant with technical skills to calm users in crisis over lost data

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BY TOM FIELD

IN NEW YORK CITY, A BOOK PUBLISHER IS THREE DAYS AWAY FROM PRINTING its biggest catalog ever, when suddenly the computers crash and all the data—covers, graphics, descriptions—is seemingly lost. ■ In California, the cofounder of an Internet startup is frozen out of a PC that holds three years' worth of critical client files, contracts and sales proposals, none of which had been saved. ■ On a cruise on the Amazon, a former circus juggler nearly faints when her ship sinks in 20 feet of water, taking with it the laptop and floppy disks that contain her unpublished memoirs. ■ Three very different computer crises, all with potentially devastating repercussions for the victims. Yet each is resolved with the help of a single person with a soft voice, technical know-how and experience in suicide prevention. Meet Nikki Stange, a self-styled data crisis counselor at DriveSavers, a Novato, Calif.-based data recovery company that specializes in helping commercial and consumer customers retrieve data from computers that have crashed, burned or just plain died. A former suicide hotline counselor, Stange

Reader ROI

- ▶ Get tips for handling data loss emergencies
- ▶ See how the human touch can benefit end users in crisis
- ▶ Learn how to avoid data disasters

End User Support

(rhymes with “dang,” a common customer exclamation) is a lifeline for DriveSavers’ most frantic customers. She talks them down from the edge of electronic emergencies, disarming people with an FM radio voice and a methodology that helps bring order to computer chaos.

On average, Stange handles five to 10 calls per day at DriveSavers’ cozy waterside office off San Francisco Bay, each of them ranging from 10 to 40 minutes in length, from people exhibiting all conceivable shades of anger, anxiety or hysteria. Typically, Stange encourages callers to share their stories, to get it all out. She empathizes, directs people away from playing the blame game, steering them instead toward possible solutions. She encourages clients to see that the problem isn’t as career-threatening as it might seem and that a resolution may be close at hand. “You can either get freaked out yourself by these calls or deny that whole aspect of it and concentrate on helping people,” Stange says. “Sometimes you can just hear the white knuckles over the phone.” But then, as Stange goes to work and leads these people out of a crisis, she can actually hear their transformation from hopeless to hope-

*“Most people know hard drives can be a problem, but they always think it can’t happen to them,” says **Scott Gaidano**, president and cofounder of DriveSavers.*

“YOU can either get freaked out yourself by these calls or deny that whole aspect of it and concentrate on helping people.”

—NIKKI STANGE, DATA CRISIS COUNSELOR, DRIVESAVERS

ful. This is the part of the job Stange likes best. “It’s very rewarding,” she says, “and the variety of people is fascinating.”

People such as Bill Oakley, executive producer of Fox’s *The Simpsons*. When Oakley’s Macintosh crashed, it took with it 12 complete *Simpsons* scripts, including the memorable two-part episode “Who Shot Mr. Burns?” Stange handled that call, the data recovery was successful, and today DriveSavers proudly displays an inscribed *Simpsons* illustration.

People such as musician Isaac Hayes, best known for recording the theme to the 1970s movie *Shaft* or, for the younger set, for portraying Chef on Comedy Central’s *South Park*. Hayes was digitally recording





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a new album when his system failed. "I didn't even know I was talking to Isaac Hayes at first," says Stange. "I just knew he was a musician with a really great voice." Stange eased Hayes' fears, DriveSavers recovered his songs, and subsequently the company received an autographed photo signed, "Thanks for saving me from the drive Shaft!"

And then there are people who aren't so well-known but whose data crises could cripple their businesses—like the IT manager of the New York City publisher that lost its catalog data three days before deadline. When this executive flew cross-country with the damaged hard drive, Stange says, the man strongly believed he had no job to return to if the data wasn't recovered. "He just sat here and waited in the office," Stange says. Fortunately, the data was recovered—and quickly enough so that the publisher, which prefers to remain anonymous, got its catalog out on time. Stange, meanwhile, witnessed the IT manager's cathartic sense of relief. "For some people," says Stange, "[data recovery] is just like getting a second lease on life."

From Human Psychology to Data Recovery

Stange grew up in Denver, graduating from the University of Colorado at Boulder in 1986 with a bachelor's degree in psychol-

ogy. While in school, Stange spent two years working on a suicide hotline in Boulder. "I was considering a career in psychology and the hotline seemed like a good experience for me," Stange says. Although frequently stressful—the callers were anonymous, and Stange rarely got the satisfaction of knowing whether, or how, people resolved their suicidal feelings—the work introduced Stange to a gratification she quickly embraced. "I liked to see that transformation as people were helped."

After college, Stange moved to San Francisco. Psychology still interested her, but she needed a break from school. She took a job in the repair department of a computer drive reseller, "and it just clicked," Stange says. "I completely fell in love with computers."

When the drive company folded in the late 1980s, Stange found herself out of work. But not for long. In 1990, she joined two friends in a startup venture—DriveSavers. "We knew there were a lot of drives out there that no one was backing up," says Scott Gaidano, DriveSavers president and cofounder. And because Gaidano and Jay Hagan, his partner and CEO, had experience recovering data from all kinds of disk drives, they felt there was a secure future in data recovery. At first, DriveSavers operated out of Gaidano's condo, and the principals didn't even draw a paycheck for the first six months. But before long, through trade magazine advertising and word of mouth at repair shops, word started to spread to consumer and commercial customers alike.

Today, DriveSavers employs more than 30 people at its Novato office complex, 20 minutes north of the Golden Gate Bridge, and the company does an average of 30 data recoveries daily—60 percent for corporate clients, the rest for individuals and small businesses.



“I was not at all familiar with hard drives, so I needed to be reassured that things really weren't as bad as they seemed.”

—HARLOW NEWTON

On average data recovery costs anywhere from \$300 to \$5,000 per job depending on the complexity and immediacy of the work, and it can take anywhere from one to seven days. DriveSavers works on all operating systems in all media and boasts a 90 percent success rate. And while the work may seem mystical or miraculous to those who don't understand it, Gaidano says data recovery really isn't so arcane after all. Without divulging proprietary techniques, Gaidano does

Harlow Newton, cofounder and director of business development of SF Station.com, turned to Nikki Stange to recover three years' worth of critical business data.

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eVOLUTIONIZING BUSINESS

Recovery Steps

What to say, what to do when IT hits the fan

First of all, when the help-desk phone rings and the caller spins a tale of woe, the best response is not "What were you thinking?"

Instead, take a page from the book of Nikki Stange, data crisis counselor at DriveSavers, a Novato, Calif.-based data recovery company. Stange can't recommend any specific training for the soft skills necessary to manage a data crisis ("How do you train someone to empathize?" she says), but she does offer several tips that IT managers can employ when dealing with disasters. (In addition, www.drivesavers.com provides more tips on how to fix a hard drive.)

Assess the Problem. It's easy to play the blame game but a lot more productive to find out exactly what went wrong with a failed system. Besides, as people talk, they

vent their emotions and become easier to deal with.

Speak the Users' Language. Computers are scary enough to users who don't know much about them. Don't compound their fears by speaking above their heads. Stange tries to match people's language depending on whether she's speaking to CEOs, college kids or Franciscan friars who just lost three years' worth of sermons.

Empathize. Reassure people that they're not alone, that computer accidents happen every day, and most data is recoverable. Sometimes that means relating stories of other people's disasters. "Let them know they're not alone," Stange says.

Channel Energy into Resolution. Once you understand the problem, steer the troubled



user away from fault-finding and toward solutions. After all, they can't change the past, but they can affect the future.

Watch Out for Projection. Fearful people tend to project their problems way out of proportion—that they'll lose their jobs, their careers, even their homes because of their computer disaster. Bring these folks back to reality, and let them know that other people really can be understanding of these crises.

—T. Field

say that DriveSavers' engineers are facile with all major operating platforms, and they keep in stock every commonly used disk drive part in steel vaults. For drives that need to be opened, engineers operate in white safety suits in a clean room of filtered air that is 10,000 times cleaner than normal air. And believe it: Some of these damaged drives need all the cleanliness they can get, especially when they've been through fires. "They're a mess, they stink," says Gaidano, describing fire-damaged hard drives. "Typically, the drives

MOST of DriveSavers' work results from user error—failure to use proper data backup techniques.

are burnt and they've been hosed with water. The platters (which contain the data) are covered with dirt and smoke." If the platters are physically destroyed, which sometimes is the case when computers have been through such natural disasters as earthquakes and major fires, then the data is lost. "But the day-to-day stuff? That's usually recoverable," Gaidano says.

Most of DriveSavers' work results from user error—failure to use proper data backup techniques or, on a lesser scale, physical problems such as power shortages caused by faulty surge protectors. Gaidano remembers a Fortune 500 company whose Unix system died, taking with it all of the company's stockholder informa-

tion. The company had previously purchased a backup system, but the hired consultant had never installed it. "This happened on a Friday," says Gaidano. "The CFO flew in with the hard drive, and he was almost suicidal. I had to take him out and give him a tour of the wine country while they worked on it!" By Sunday, the data was recovered; by Monday, the CFO was back at work, his system was up and running without business interruption. "Most people know hard drives can be a problem," Gaidano says, "but they always think it can't happen to them."

DriveSavers isn't the only company in the data recovery business—the Data Recovery Group in San Leandro, Calif., and Ontrack in Eden Prairie, Minn., are two prominent rivals in this niche marketplace—but this is the only one to tout the services of a data crisis counselor. Is it just a northern California thing? Not from Gaidano's perspective. Anyone who's ever suffered a computer failure, or dealt with someone else's, can understand why DriveSavers quickly found a way to employ Stange's psychology skills. "We'd get these calls for help, and a lot of people were just too freaked out for us," Gaidano says. "We knew Nikki had these qualifications, and we couldn't stand the calls, so we started sending them to her."

Stange liked taking the calls. Unlike the suicide hotline work, where she seldom knew her clients' names or what ultimately became of them, DriveSavers offered Stange the chance to talk people out of emotional distress and see them through to real technical solutions. "I haven't actually talked to anyone who's been out on a window ledge with their laptop, ready to jump," says Stange. "But the intensity of our clients' emotion is similar [to those from the suicide hotline].

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The crash of a hard drive can be job-threatening, and the loss of a job can be a life-changing event. In that situation, it's not uncommon to feel a void right in the middle of your being." Stange's approach: "I just hang in there with these people. I accept their emotion—I acknowledge and validate it," she says. "It's not about being right or wrong; it's about understanding. Really, that's what a lot of therapy is based on. It makes sense to me."

The Waterlogged Laptop

Remember the ex-juggler on the Amazon? That story made a name for Stange and DriveSavers.

The call came in Feb. 26, 1993, the day the World Trade Center was bombed. "A real weird day," Stange recalls. It was the former juggler on the line, frantic. She'd been enjoying an Amazon cruise in Brazil, writing her memoirs, when the ship struck an underwater barge and sank in 20 feet of water. The 270 passengers got off safely, but the former juggler's laptop, floppy disks and heirloom diamond ring went down with the ship. In addition, she had lost her financial data, correspondence and travel journal. Undaunted, she rented scuba gear, dove to the ship, smashed a window with a flashlight and found her way to her stateroom. When she resurfaced, she had her ring, computer, disks—and a data recovery quandary. How does one recover data from a sea-soaked hard drive? The woman took her machine to a Florida repair shop, which referred her to DriveSavers. Stange took her initial call, calmed her down and convinced her to ship the waterlogged computer to DriveSavers. And sure enough, her finance history and memoirs

were recovered, albeit never published (at least not that anyone knows—Stange and her colleagues have lost touch with this client, who could not be located for comment).

Soon after this incident, Stange noticed the woman's water-damaged computer sitting around DriveSavers' office, and she said to Gaidano, "This story might be interesting to the press." To that point, publicity had never even occurred to Gaidano. The company existed entirely on advertising and referral. But on a whim, Gaidano decided to bring the damaged computer to a computer trade show, where he displayed it at DriveSavers' booth. "The press loved it," Gaidano says. Today, DriveSavers travels to trade shows with what Gaidano calls an entire freak show of burnt, crushed and mutilated computers whose data has been recovered.

But beyond the publicity, Stange's job boils down to helping everyday people overcome everyday computer disasters. Remember the Internet startup executive? That's Harlow Newton, the cofounder and director of business development of SF Station.com, a San Francisco city guide. When his PC crashed last year, he saw his career flash before his eyes with the realization that he'd lost access to three years' worth of critical business data. "I was kind of hysterical when I called DriveSavers," says Newton. His call was routed to Stange, who reassured him that these things happen all the time and that DriveSavers has a 90 percent recovery rate. "I was not at all familiar with hard drives, so I needed to be educated, to be reassured that things really weren't as bad as they seemed," Newton says. "[Stange] made me comfortable knowing that she'd handled situations like this in the past." Newton sent his hard drive to DriveSavers. Three days later, he received a CD-ROM containing 99.9 percent of his lost data. Lessons learned? "We back up everything now," says Newton.

Clearly, not every recovery effort is successful, and not every client is easily placated. When Stange encounters one of these cases, she tries to be both honest and hopeful. "I let them know in a gentle way that there is no possibility of recovering their data, and I try to help them understand why," Stange says. "Then I ask if they have even some old backups; I try to help them identify resources available to them to rebuild and recreate what was there on the drive. I try to get them to focus on that which is most important right now. It's easy in the midst of a crisis to think globally, but it might be that there's just one file they need to finish off the week or the month."

After a decade of data crisis counseling, Stange admits the work can be stressful. "But I have this really fabulous lava lamp in my office," she says, and when that fails to soothe, she's off body-boarding in the Pacific. Certainly if she wanted to, she could make a move into purely technical or psychological work. But right now this mix feels right. "If I was doing just technology work without the human element, or psychology without a technology element, I wouldn't be satisfied," says Stange. "This is really perfect for me." **CIO**

Avoidance Techniques

Nip your data crisis in the bud

Of course, the best way to deal with data crises is to avoid them. DriveSavers' Nikki Stange offers these data disaster prevention tips:

Have a Backup System. It's surprising how many supposedly critical information systems have no reliable backup systems. Yet, the best and cheapest way to ensure data recovery is to make sure data is backed up and saved at least once daily.

Assign Backup Responsibility. A backup system is no good if no one knows it's their job to make the backups.

Make a Data Recovery Plan. Most companies have disaster recovery plans accounting for business continuance and replacement of physical goods in the event of natural disaster. But how many of these plans account for data recovery? Make sure your people know where to go and whom to call in case of data loss.

—T. Field

How does your company respond to data crises? Tell Tom Field at tfield@cio.com.

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The Glass Highway

Fiber is coming to the desktop. Should you care? BY JOHN EDWARDS

FOR THE SPARTANBURG County Library in Spartanburg, S.C., implementing fiber to the desktop represented a bold move, a journey to a place where bandwidth is abundant and network logjams are just a dusty memory. Yet the decision to go with fiber also meant taking a risk—hoping that a bleeding-edge technology

was ready for a mainstream educational facility.

Selecting fiber to the desktop was a gamble, but one with a potentially big payoff, says Tom Lowrimore, the library's systems and planning coordinator. Back in 1997, when Lowrimore was designing the network infrastructure for the library's new headquarters and central branch, he

Edited by Christopher Lindquist. Send your thoughts and ideas for future columns to et@cio.com.

desktop fiber...RAID...B2B boom...online personalization

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faced the choice between fiber and copper—a situation in which the metal usually comes out on top. But in this case, “fiber won because we don’t often get the money needed to tackle an upgrade on a buildingwide scale,” he says. “We wanted something that would last at least 20 years. Fiber would let us move into the future.”

Falling Barriers

Fiber to the desktop has always been a great idea for performance reasons, but the technology has long been stalled by cost and technical burdens, including fragile, nonbendable cables and finicky, problem-prone connectors. But fiber to the desktop’s prospects have grown much brighter recently, says Lauri Vickers, a communications industry analyst with Cahners In-Stat

optics, you literally have to break into the cable in order to snoop,” says Vickers. For the same reason, fiber networks are highly resistant to outside interference from radio signals, heavy machinery and other electrical generation sources. “If a power plant opens next door, it’s not going to interfere with your fiber network,” says Vickers.

Fiber customers also enjoy the technology’s robust signal strength. While copper cable runs top out at only a few hundred feet, fiber links can span up to three kilometers before requiring amplification. In big networks, that means less hardware and fewer wiring closets.

Fiber technology also reduces latency—the time between initiating a request for data and the beginning of the actual data transfer. “Every time you take a signal,

“You wouldn’t want to change your building’s plumbing every three to four years, so why wouldn’t you want to build your networking infrastructure to last?”

—Patrick McHugh, MIS director, Hilton Hawaiian Village

Group, a technology research company in Scottsdale, Ariz. “The falling price of fiber, because of improved manufacturing methods and increased competition, has been a big part of the story,” she says. The other piece of the tale is a new generation of simpler connectors and more flexible, easier-to-route cables. These elements, combined with fiber’s ability to accommodate high bandwidths (from 100Mbps Fast Ethernet to Gigabit Ethernet), have made fiber to the desktop an attractive proposition for a growing number of organizations.

Fiber is more than just fast. It’s also very secure. Unlike standard copper wiring, fiber doesn’t radiate signals that can present a possible security hole. “With fiber

clean it up and retransmit it, you’re going to introduce more delay,” says Vickers. Latency is a critical issue for networks running Internet protocol (IP) telephony and multimedia technologies, where the phenomenon can cause delayed and jumbled sounds and images.

Speed and Reliability

At the Spartanburg library headquarters, fiber to the desktop has meant having the ability to send multimedia content, as well as high-speed data traffic, to 110 desktops. Reliability has been another major benefit, says Lowrimore. “Whenever there’s a storm, I don’t have things killed by lightning, a big problem in this neck of the

new products

Help Yourself

Web-based support is becoming increasingly critical, both as a way to reduce corporate support costs and as a convenience feature customers have come to expect.

RightNow Technologies hopes to ease the online support burden with **RightNow Web 3.2**, the most recent upgrade to its customer service suite. RightNow Web’s tools provide support via self-help answers to common questions, e-mail, live chat, issue tracking and service contract management. Features include a SmartAssistant that can help users pinpoint relevant answers as well as a natural language search engine. Pricing starts at \$34,995 for a two-year license. For more information, visit www.rightnowtech.com or call 406 522-4200.

Store It Away

Archival tape systems provide inexpensive storage, but at the price of retrieval times that are sometimes too slow for critical data. To get around that, **Grau Data Storage’s** new **Infinistore Virtual Disk** combines the multiterabyte capacity and relatively low cost of tape storage with the speed of hard-disk RAID in a single unit. Just one Infinistore cabinet can house up to 400GB of RAID-5 disk storage and as much as 20 terabytes of Sony’s AIT-2 or

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woods.” Lowrimore says he hasn’t had to replace any hardware because of mechanical or electrical failure during the network’s three years of operation. “That’s certainly been a big cost benefit,” he notes.

Other cost fears may be overblown as well. Lowrimore says the fiber media actually priced out about 30 percent lower than bids he received for UTP (unshielded twisted-pair) Category 5 copper cabling. Network adapter cards, hubs and related

alternatives, McHugh discovered that a fiber network would cost slightly more than a UTP Category 5 copper system: approximately \$120,000 versus \$112,000. But fiber offered an important cost-savings benefit. The technology allowed McHugh to slash the number of wiring closets used by his network from 13 to three active and two passive (only three have electricity), saving precious space in a corner of the world where cheap real

“Since most organizations have huge investments in copper cable, there won’t be any sudden move to rip out existing wiring and replace it with fiber to the desktop.”

—Laurie Vickers, communications analyst, Cahners In-Stat Group

fiber electronics hardware totaled slightly higher than the estimated cost of their copper counterparts. In all, the overall implementation (put in place by Atlanta-based systems integrator Fiberworks) totaled slightly less than the estimated cost of a high-bandwidth copper environment, says Lowrimore. “We were pleasantly surprised given everything we had heard about [the cost of] optical fiber.”

Fiber in Paradise

And even when it does cost more initially, fiber can save money in other ways. Like Spartanburg, the Hilton Hawaiian Village resort on Waikiki saw fiber as a way to avoid costly network upgrades in the near future. “We wanted to come up with a system that would last us anywhere from eight to 12 years,” says Patrick McHugh, Hilton Hawaiian Village’s MIS director. “You wouldn’t want to change your building’s plumbing every three to four years, so why wouldn’t you want to build your networking infrastructure to last?”

After checking the prices for various

estate is as rare as snow. “We use a central zoning technique,” says McHugh. The network’s main switches are located in the computer room. Cables run to patch panels in each department. “If you have to put new runs in, you only have to run them to the patch panel,” he says.

Fiber offered another bonus as well. Because of space restraints, the previous network’s hubs were located in mechanical rooms and subject to heat and other adverse environmental conditionals. “If we had gone with Fast Ethernet copper, we would have been forced to move the switches into actual work spaces,” says McHugh. The organization would have then faced the extra trouble and expense of disguising and soundproofing the hardware, at a cost of several thousand dollars for a series of special enclosures.

McHugh says the network’s rollout has been trouble-free. The only glitch was a missing DOS driver, which was needed to run some legacy applications. “3M stepped in and wrote us a custom driver, so that problem was quickly solved,” says Mc-

new products

Exabyte’s Mammoth-2 tape storage. The entire unit appears as a single logical drive that can be partitioned by an administrator for different uses. Pricing for a 2.5-terabyte system starts at \$100,000. For more information, visit www.graudata.com or call 303 665-3018.

Unwired

Using a WAP-enabled cell phone to access stock quotes or sports scores is fine, but such tasks might not be the most useful application for your fancy communicator. **InfoWave** is trying to up the power of WAP through a trio of tools that provide remote access to corporate resources—even those behind a firewall. **FirstHand** allows WAP devices to connect to Microsoft Outlook e-mail, calendar, contact and task features.

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InfoWave for the Net completes the set by adding corporate intranet and extranet access. Pricing is per-seat and starts at \$60 for FirstHand to \$350 for the suite. For more information, visit www.infowave.com or call 604 473-3600.



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Hugh. "I have no regrets about going with fiber. I would do it again in a heartbeat."

And initial success invites bigger plans for the future. The resort expects to bring an additional 133 desktops into the fiber network by the end of this year. The company is also looking into the possibility of using fiber to provide multimedia services and high-speed Internet connectivity to its guests. "But that's farther down the road," says McHugh.

A Fiber Future

Although fiber is rapidly joining the networking mainstream, Cahners In-Stat Group analyst Vickers doesn't foresee a rapid abandonment of copper technology. "Since most organizations have huge investments in copper cable, there won't be any sudden move to rip out existing wiring and replace it with fiber to the desktop," she says. Vickers believes that most organizations will wait until their existing networks' capacity is pushed to the breaking point before switching to fiber. "For now, most desktop fiber purchases will be for new installations rather than upgrades," says Vickers.

Organizations that do adopt fiber to the desktop over the next few years will have to pay close attention to the people they hire to install and maintain their networks. "Although fiber is more reliable than copper, it can be tougher to fix," says Bill Lennon, a Ph.D. engineer at Lawrence Livermore National Laboratory in Livermore, Calif. "A lot of technicians are just moving into fiber, so it can be tricky finding people who fully understand how to maintain and repair fiber networks."

But Vickers believes that despite a few growing pains, fiber to the desktop is destined to become the predominant local area network media. "It's the future of networking," she says. "The outlook is clear." ■

Are you an efficiency expert? Tell us about it at et@cio.com. John Edwards is a freelance technology writer based in Gilbert, Ariz. He can be reached at jedwards@john-edwards.com.

REVISIT data storage

Storage Goes Critical

Space demands have exploded beyond even our lofty projections

BY FRED HAPGOOD

EIGHT YEARS AGO it was already obvious (at least to us) that at some point CIOs were going to morph into CSOs—corporate storage officers. Every year the data river flooded higher and ran faster, with every byte requiring storage methods that were secure, shareable, scalable and monitorable, and could deal nimbly with an ever-wider range of user classes and network types. Sooner or later storage issues had to overwhelm the IS agenda. You can get along with last year's processor, but relying on last year's storage could put a company out of business.

In June 1992 we took a look at the coming era of storage-centric IT, dividing our attention between a new idea in storage management and a laundry list of new hardware technologies, including several flavors of optical media and the then-new concept of molecular storage.

In retrospect, we might have understated the trends. The online revolution has blown storage out along one dimension, by multiplying the number and kinds of users, while storage-intensive applications like data mining and multimedia have increased demands along another. At the Network Storage 2000 conference in June, EMC Corp. CEO Mike Ruettgers predicted that in three years the typical global business will serve more than a petabyte (1,024 terabytes) of online data, under ever-more stringent reliability requirements (a storage failure today can lead to a major stock dump). According to Gartner Group, this year the storage function will take 70 percent of the IT budget—and the curves all point up.

Yet while we probably understated

storage needs, we may have overstated the need to move to exotic new technologies. The industry has been able to deal with inflating storage demands without the fancy high-tech media (molecular, optical and others) we examined in our piece. The significant changes in storage have all been in the sphere of management, not in new technologies, a focus that looks to be growing even tighter over the next few years.

One of the first examples of this point was the insight, made by some computer scientists at Berkeley in the late '80s, that a number of disks acting in parallel could read out data at rates unachievable by a single disk. Specifically, if an "intelligent write" operation spread a file across several disks, then an "intelligent read" could pull



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According to Gartner Group, this year the storage function will take 70 percent of the IT budget—and the curves all point up.

the various parts of that file from several disks simultaneously, combine them and deliver the file as a whole, thereby emulating a single disk with awesome seek times.

This insight did not require fancy new storage media. On the contrary, in theory the system allowed managers to substitute many cheaper, slower, microcomputer disks for a few large, expensive, high-tech disks. This promise was reflected in its original name: redundant array of inexpensive disks (RAID). (Later, when actual RAID products proved not to be that cheap after all—the individual drives didn't cost much, but users had to buy a lot of them to match the storage of more traditional big-platter drives—the "I" was changed to mean "independent.")

RAID was the management idea we were looking at in our 1992 article. Though it was new to the market, we were very enthusiastic, and, in fact, RAID did go on to become one of the great success stories in the history of data storage. (Though according to Peter Doob, vice president for RAID customer liaison at MTI Technology Corp., a data services company in Anaheim, Calif., the major marketing driver was not read performance but security: Writing a database to several drives at once not only enhanced read times, but it also gave a network seamless protection against hard disk crashes.)

RAID was only the first example of using better management as opposed to exotic technologies. After our article appeared, a second emerged: storage appliances (SAs), otherwise known as network-attached storage. SAs supply all the storage functions for all the devices attached to a network, including backup, informa-

tion protection and data compression. They allow a CIO to set a consistent storage policy across an entire network.

According to Howie Wilcox, an evangelist at Network Appliance in Sunnyvale, Calif., which makes such devices, storage appliances also are defined by sophisticated systems of change detection and handling, which allows them to generate images of databases with far fewer resources than conventional RAID boxes.

SAs have the disadvantage of depending on LAN connections, which in the online era are not always as fast as needed. For such cases, companies like Chatsworth, Calif.-based DataDirect Networks make storage-area networks, which connect the devices needing and supplying storage with their own very high-speed connections. These two innovations have made it possible for a new industry segment to emerge: the storage service provider (or storage utility), which handles storage on an outsourced basis.

Overall, storage and processing, which once were married in the desktop, have gone in opposite directions. Storage has consolidated, with more of it in fewer places, while processing has differentiated, moving into devices like cell phones and digital cameras. This conceptually simple change has allowed companies to enter and flourish in the storage-centric era. As much fun as new-media technologies are to write about, the lesson of the storage revolution is that, sometimes, good management is really enough. ■

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Portal Power

Sequoia Software has recently released the third generation of its XML-based enterprise portal product. According to the company,

XML Portal Server 3.0 lets corporations integrate disparate systems and applications, providing access to them all through a browser-based interface. **XPS 3.0** offers a variety of features, including a rules engine for automating business processes, support for wireless devices and an integrated application server that supports load balancing across distributed servers. Product pricing starts at \$500 per user for a minimum of 100 users. For more information, visit www.sequoiasoftware.com or call 410 715-0206.

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PREDICTIONS

e-commerce

B2B Bus Is Leaving Now...

BUSINESS-TO-BUSINESS transactions will account for more than \$6.3 trillion in online spending in the United States, according to a recent report by San Francisco analysis firm Jupiter Communications. If that sounds like a lot of money, it is: an increase of \$6 trillion over 2000's \$336 billion total.

The forum where these online transactions take place will also transform dramatically in the next five years, the report says. Where 92 percent of today's B2B transactions take place in a direct, one-to-one relationship between buyer and seller, by 2005, markets will handle 35 percent of those transactions. These markets will consist of both Net markets, made up of many buyers and sellers, and coalition markets, made up of consortiums of buyers and sellers. According to the report, these markets could "completely disrupt current channels."

The report concludes that these big numbers should prompt companies to develop their B2B infrastructure. If they don't, they'll risk missing out on efficiency, pricing and sales opportunities that will appear in the near future. If you don't want to be left behind, Jupiter recommends that companies investigate a mix of direct and market models and suggests that companies with a stronger market position should concentrate on direct sales while smaller, weaker companies look for their chances in the Net and coalition markets.

—Christopher Lindquist



new products

It Lives to Serve

Oki Data has unveiled the **OkilAN 6100e+** Ethernet print server. The server offers 10/100Mbps Ethernet support as well as compliance with the Internet Print Protocol, which lets users submit print jobs to network printers by e-mailing them to an IP address instead of an e-mail address. With the addition of an optional IR Infrared Transceiver, the print server can also print directly from IR-enabled cell phones, personal digital assistants and notebook computers. The 6100e+ has a list price of \$335.99. For more information, visit www.okidata.com or call 800 OKI-DATA.

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UNDER DEVELOPMENT
security

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THINK ABOUT your firewall. There it sits, a virtual deadbolt defending your company's systems against all that's evil on the Internet. But what happens when someone picks the lock—or comes busting through the door? Once inside, hackers often find little resistance behind the scenes. And worse, what if your enemy is *inside* the company walls?

Enter the Department of Energy's Sandia National Laboratories. Back in 1997, the Albuquerque, N.M., research center began investigating the possible uses of

"swarm behavior," where collectives of small, simple systems perform dauntingly large tasks. (Mr. Rogers was right—it's nice to cooperate.)

In short order, the research uncovered a potentially powerful use—computer and network security. Instead of a monolithic barrier (the firewall) charged with monitoring traffic to and from every system in a network, Sandia's researchers proposed that collections of "cyberagents" running on each individual system could do a more effective job.

In the Sandia model, programmers write cyberagent technology into the code of networked applications (they've already built an agent-enabled Web server). These applications then know how to protect *themselves*, instead of relying on third party add-on products to do the job. The current agent is also a jack-of-all-trades that understands a variety of network-related security tasks—checking XML, e-mail, FTP and more—making it appropriate for many kinds of applications. Even better, the agents are intelligent enough to work together. If one detects an attack, it can quickly inform other connected agents, giving them a chance to prepare for—or to warn human administrators about—the impending danger.

The result is a more resilient system that's less likely to fail because of a single weak link. And according to principal investigator Steven Y. Goldsmith, the agents are general-purpose enough that their designers could program them to do far more than simply act as security guards. For instance, the agents could integrate into ever more powerful search engines or highly secure shopping bots.

Sandia is investigating technology transfer opportunities with a private company to begin deploying products based on the technology, but don't look for any results soon. Goldsmith estimates that initial products won't go into alpha testing until next June. He also notes that the first products will focus on securing intranets from internal attackers, rather than making the entire Internet a safer place to live and work. Intranets, he says, have more clearly defined sets of security rules, making them more controllable test beds for the earliest products. As a result, full-fledged Internet protection products won't arrive for at least two or three years. —Chris Lindquist

If one detects an attack, it can quickly inform other connected agents, giving them a chance to warn human administrators.



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Opinion

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Difference Engine

The Social Impact of Technology

Pull the Plug!

Computers in the classroom don't solve any problems—in fact, they often make things worse

BY CLIFFORD STOLL

THIS YEAR WE'LL spend some \$3 billion to wire our nation's classrooms, bringing students into the Internet era with computers, multimedia and Web connections. On the surface that may seem like a worthy effort. But as information executives know, technology is not an end in itself. Rather, its value comes from solving real problems. So what pressing issues are computers solving in education?

Among the challenges confronting our elementary and high school students today, one might list short attention spans, lack of discipline, cynical attitudes, too much television, low regard for teachers or little interest in reading. OK: Which of these problems are solved by a classroom computer? Which, on



the other hand, are made worse?

The one thing that the networked computer does well is to give our kids more information, faster. But lack of information simply isn't a problem in any school I've visited. Indeed, most teachers complain that they haven't enough time to teach the information that's already available.

Some might argue that the goal of wiring schools is to replace outdated textbooks with the latest information from

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Occupation: Barber

Hobbies: Baseball, Gossip

Years on the Internet: 1

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the Net. But most subjects don't change that quickly. The core of physics and chemistry, for example, evolves slowly. Schools certainly don't need the Internet to teach poetry or literature. And only a fool would teach current events from a textbook—that's the purpose of magazines, newspapers and the daily news.

Maybe we're wiring our classrooms to promote computer literacy. But how much computing does a student need to be taught? I'd say that a high school graduate oughta be able to use a word processor, manipulate a spreadsheet, know what a database does, use e-mail, browse the Web and use a search engine. OK, how long did it take you to learn to use a word

For most schoolwork, searching online source materials not only isn't necessary, it's often counterproductive.

processor? A day? Maybe three? Did it take you a week to figure out how to surf the Web? Aside from the mechanical typing lessons, this just isn't challenging stuff. And whatever the problems confronting our students, fear of computers isn't one of 'em. Nor is the inability to use the Internet. Quite the opposite: Kids quickly take to computers and will happily spend hours sending e-mail, logging into chat rooms and generally fooling around online.

Computer literacy doesn't demand the same level of instruction as English, American history or physics. Spending semesters teaching computing simply subtracts time from other subjects. It's one more way to dumb down the school, giving the appearance of teaching futuristic subjects while dodging the important topics. You can learn how to use computers anytime in life, but some subjects really are best learned when you're young—foreign languages, musical instruments, just to name two.

The fact is, computers don't belong in the classroom. Not only do they not help solve any educational problems, but they very often make existing problems worse.

Whenever I point out the dubious value of computers in schools, I hear the comment, "Look, computers are everywhere, so we have to bring them into the classroom." Well, automobiles are everywhere too. They play a damned important part in our society, and it's hard to get a job if you can't drive. But we don't teach "automobile literacy." Nor do we make cars a central part of the curriculum—indeed, many schools are now dropping driver's ed, recognizing that teenagers can learn to drive without intensive schooling.

And yes, computers seem ubiquitous, but that's no reason to

bring them into the classroom. Television is certainly omnipresent, but it's been relegated to a fairly minor role in schools. I don't hear politicians worrying about some "television divide" separating those with the tube from those without.

Computers encourage students to turn in visually exciting hypermedia projects, often at the expense of written compositions and hand-drawn projects. Pasting a fancy graphic into a science report doesn't mean an eighth grader has learned anything. Nor does a downloaded report from the Internet suggest that a student has any understanding of the material.

Instead, the emphasis on professional reports sends students the message that appearance and fonts are more important than content. Indeed, for most schoolwork, searching online source materials not only isn't necessary, it's often counterproductive. Computer-enabled students spend more time preening their reports than understanding the subject matter.

By wiring our schools we make a funding decision about what's academically important. Next time a principal or school-board member shows off a modern computer lab, ask 'em this: "What was in this room before these computers?"

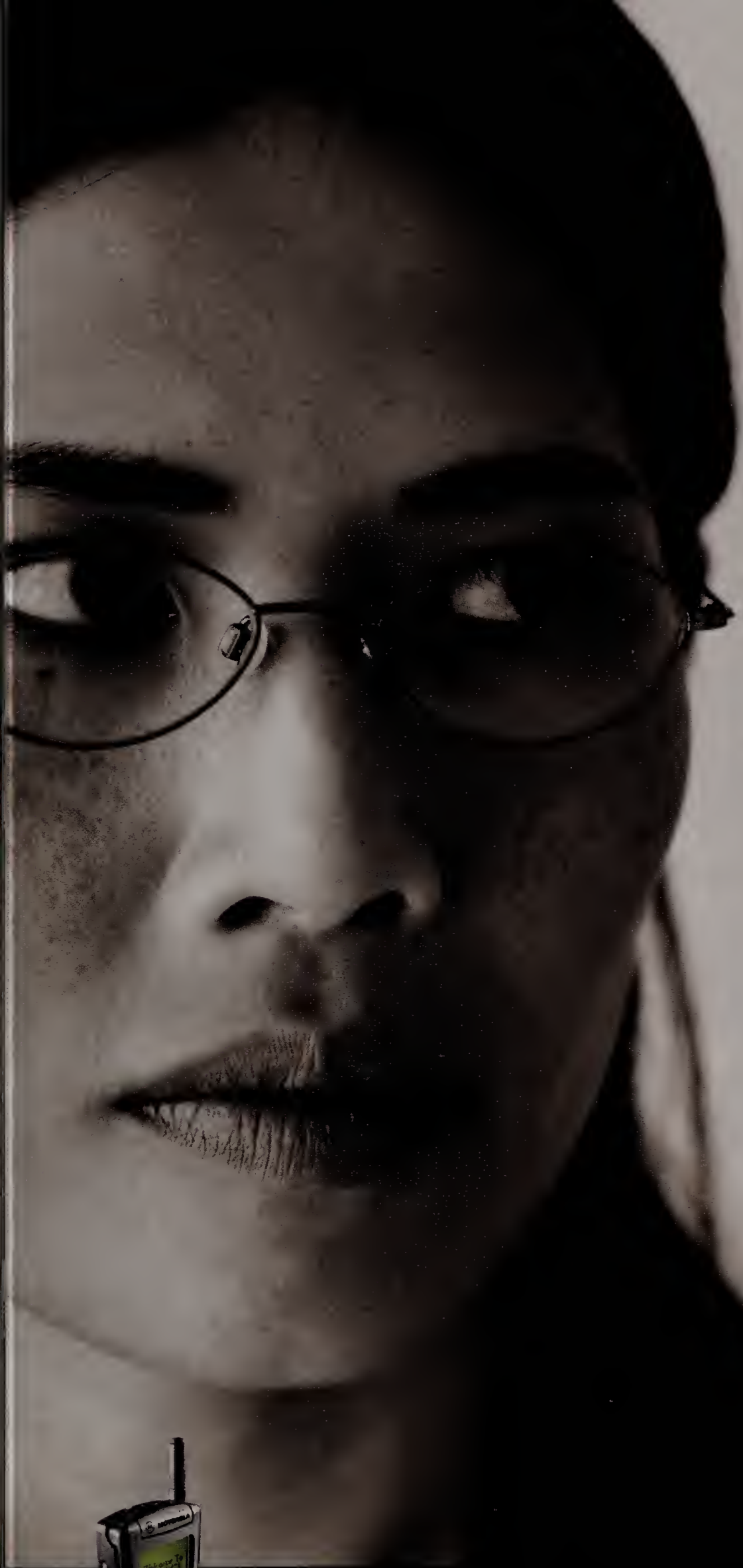
I asked that question recently and got the following answers:

- "We converted the library into the computer lab. With the multimedia encyclopedias, we no longer need as many books."
- "Oh, we used to teach art in this room."
- "This used to be our machine shop."
- "A music studio...."

And if you think technology cuts into only school libraries and music programs, you should check out high school chemistry labs. The days of test tubes and Bunsen burners are disappearing fast as school districts get scared of students handling chemicals. Too easy to spill acid, burn a finger or build a bomb. As safety concerns drive up the cost of real labs, schools turn to high-tech solutions: computer simulations. Like learning to drive a simulated car, it's fun, but it sure ain't the real thing.

Politicians tell us to wire our schools so that graduates will be prepared for jobs. But by focusing on computers, plenty of technical jobs are being bypassed: High schools are slyly dropping courses in plumbing, auto mechanics, carpentry and cooking. Do we really expect a future without pipes, cars and restaurants?

Shouldn't computers reduce school costs by making administrative activities more efficient? I wish it were so. As computers become widely adopted in elementary and high schools, they add a whole new layer of school administrators and middle managers. These include content administrators to watch over what the students view and technology specialists to show teachers how best to use the digital machines.



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And don't forget that school computers need technical support—it's silly to expect English teachers to install and maintain the high school's file servers. In business, you figure one full-time support person for every 20 or 30 workstations. The tech folk aren't cheap, and they don't teach. Each program—even

ogy saves money? Nah.

In short, no amount of Web searching can make up for a lack of critical thinking or communication skills. No micro-processor can replace the creative interplay of hand, clay and art teacher. No online astronomy program can engender the same sense of awe as first seeing the rings of Saturn through a telescope. No computer will encourage a budding athlete to run faster, kick harder or jump higher. With or without a computer, a mediocre instructor will never kindle a love for learning. And a good teacher doesn't need the Internet to inspire her students to excellence.

With or without a computer, a mediocre instructor will never kindle a love for learning.

the simplest—requires someone to get the computers ready. Inevitably, it's the teacher. The dirty secret of educational technology is that computers waste teachers' time.

Around the country, communities float 30-year bond issues to buy computers that will be obsolete within five years. Wiring a school typically costs thousands of dollars per classroom, and evolving communications systems will mean that the work will have to be redone within a decade. Classroom software has a surprisingly short life as the curriculum, computer and educational climates change. Educational technol-

Want a nation of dolts? Center the curriculum around technology—teach with videos, computers and multimedia systems. Aim for the highest possible scores on standardized tests. Push aside such less vocationally applicable subjects as music, art and history. No doubt about it: Dolts are what we'll get. **CIO**

Do you think education needs computers? Let us know at difference@cio.com. Clifford Stoll is author of *High Tech Heretic: Why Computers Don't Belong in the Classroom and Other Reflections by a Computer Contrarian* (Doubleday, 1999).

Coming in CIO

Look for These Articles in Future Issues

Managing Your Vendors

The way you manage your vendors is critical to the survival of your organization. We'll introduce you to some of the best vendor managers in the business and show you what they're doing. We'll also introduce you to a wave of channel vendors and show you how they will influence your company's future.

The Web Reinvents the Brothers

Brooks Brothers lost 36 percent from its bottom line last year and has curbed its expansion of physical

stores. At the same time, the company is making new investments in its online retail operations and is proceeding with a strategy of integrating its physical and online businesses. Learn what's really threatening Brooks' Brother's business and how the Web is part of its reinvention plans.

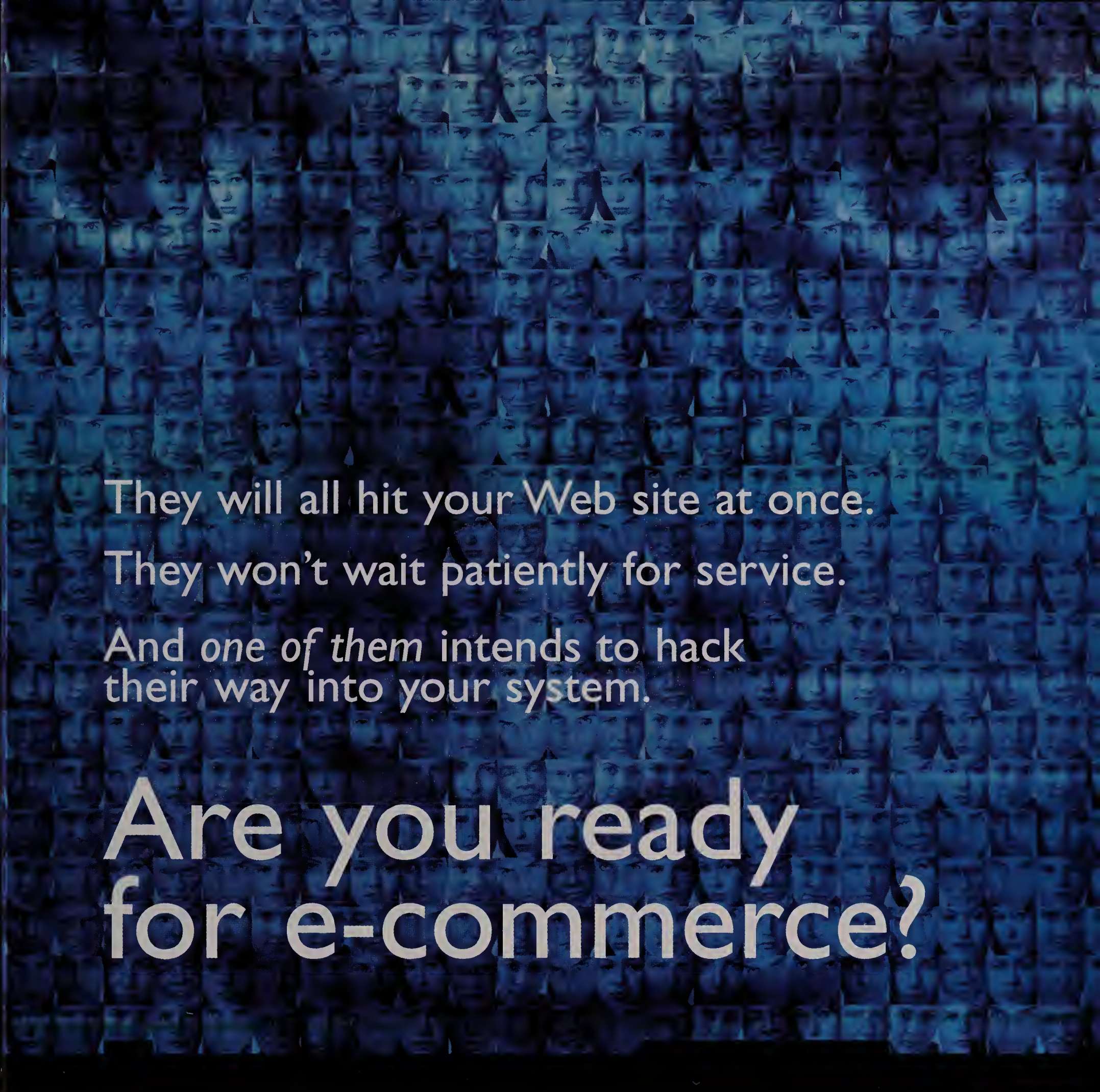
Where Does all the Dot Software Go?

As the graveyard for retail dotcoms starts filling up, failed companies, their buyers and liquidators are selling off their assets. What's the software engine of a dotcom worth, and is it worth it to you to try to acquire it? Have any surviving dotcoms decided

to turn their technology into a profit center by licensing it to other online companies? Read this article to find out why.

Something for Nothing

Wouldn't it be great if readily available open-source software could unleash innovation in your company? It can. Eric von Hippel, a professor at the Massachusetts Institute of Technology, and Karim Lakhani, a former student, have been studying how the process of innovation works in the development of open-source software. Read this story to learn the implications that their research will have on your company, your business and the future of innovation.



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Opinion Reality Bytes

A Cold Look at Hot Trends

Money Matters

Let us toast the bursting of the dotcom bubble;
it could be the start of something sane

BY MEGAN SANTOSUS

I'LL ADMIT IT: The thought of some fresh-faced twentysomething becoming a dotcom millionaire after only a few months of sweat equity (if you want to call taking meetings at Starbucks for 18 hours a day sweaty) makes me more than a tad envious. Actually, it really ticks me off. I've been in the same industry for more than a decade, working my way up the ladder to a rung just below middle management. During that time, I've managed to put aside a tiny, yet consistent pretax chunk of every paycheck in the hope that one day I will not become a burden to my kids. Then along comes dotcom fever and the advent of the 90-day millionaire. The world pegs me as a loser because I've spent the bulk of my career with one company and my net worth doesn't surpass the GNP of Guatemala.

Personally, I'm not as interested in strike-it-quick riches as I am concerned—some might say irrationally worried—about having a comfortable nest egg. My 401(k) balance still hasn't caught up with my salary. Frankly, I'm about tapped out when it comes to imaginative ways to stretch the \$1,117 I'll receive each month in Social Security benefits. By 2030 it will translate to about \$198.50. But retirement-envy aside, the recent



shakeout and layoffs among dotcoms is good for more than just my psyche; it's good for business in the long haul.

The Surreal Deal

When Internet mania took off in earnest, venture capitalists, individual investors, executive talent and rank-and-file employees tumbled all over each other in the hopes of latching on to a startup that would make them a buck or two...million. Among the more popular repositories for money and talent were online pet stores, toy stores, grocery delivery services, high-fashion boutiques and lifestyle magazines. But did anyone seriously think a website proffering Liv-a-Snaps and chew toys—and leaking money like a sieve—was worthy of a stock price in the hundreds of millions? I suppose those executives who quit their steady, six-figure-salary jobs did, or they wouldn't have abandoned the companies that trained and nur-

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tured them in order to helm startups with no plans of turning a profit until maybe 2020.

Many of these retail and information sites are useful but they're not going to rock anyone's world, much less generate a new business paradigm. Why would a horde of people log on to Kozmo.com to order a video and pizza that will be delivered in an hour when they can hop into their trophy SUV and

Many pundits scoff at the idea that Internet startups should concern themselves with anything so mundane as making money.

pick up the same stuff in half the time? True, there's probably a solid market for home-delivery services, and an online company that can deliver value may enjoy a comfortable and profitable existence. But no company in this space should have a marketing and advertising budget that rivals those of the Big Three automakers.

But as venture money poured in, plans for IPOs followed. And before anyone knew it, upstart ventures run by children with sketchy business plans enjoyed valuations that rivaled GE's, a company founded in 1878 with a CEO who currently is considered a certified management genius.

Suddenly, any kid with an MBA believed they held the winning lottery ticket in a multistate Powerball game. The ready-to-take-on-the-world confidence they felt was quickly transformed into smugness, thanks in large part to a fawning media that portrayed Internet entrepreneurs as capitalism's saviors. (Remember *Time* magazine anointing Jeff Bezos as its Man of the Year?)

Wishful Thinking

Many new economy pundits scoff at the idea that Internet startups should concern themselves with anything so mundane as making money. It's their long-term potential to change commercial transactions as we know them, they say, that makes these companies so valuable now. No doubt just such an attitude fueled and condoned spending sprees worthy of Imelda Marcos. Internet startups burned through funds like there was no tomorrow. (And for Boo.com, Toysmart and others, there *was* no tomorrow.) Does anyone remember a single, jillion-dollar-a-second spot for a dotcom from last year's Super Bowl? The concept of building a brand through satisfied customers rather than bizarre commercials apparently is lost on the dotcom crowd.

It seems that many investors and entrepreneurs wholeheartedly bought into the idea that the Internet speeds up everything.

And it does speed up business processes such as procurement, purchasing, ordering and shipping. But what it doesn't speed up is due diligence. Companies that hope to succeed long-term need to study the market, attract a loyal clientele, groom seasoned management and make sound alliances. While any one of these tasks can be rushed without adverse effects, rush them all, and you're sowing the seeds of disaster. If you're dead set on becoming a multimillionaire by next Tuesday, you'll probably be on the unemployment line by this coming Monday.

A Silver Lining

All the mumbo jumbo about brands, business models and value chains obscured a sober but obvious lesson. Money—as in positive cash flow—does matter. Now that layoffs and plummeting—yet more realistic—stock prices are hitting dotcoms where they live, the philosophy of Benjamin Graham, Warren Buffett and their value-focused ilk will hopefully take hold again. I, for one, will be ecstatic if the instant gratification attitude that typifies the Internet crowd gives way to a long-term perspective that's less hectic and less concerned with daily stock prices. A little humility can go a long way.

I've not given up on the dotcom economy. Those companies that can weather some belt-tightening and accept the idea that successful businesses need to be nurtured over time will do quite well for themselves. Of course, today it may not be as easy to recruit hot young things with stock option dreams. But even some dotcom executives recognize that a fall to earth is a good thing in the long run. Greg Bott, chief technology officer of INC2inc, an online marketplace for the food industry, has the right philosophy on HR matters. In a recent conversation, I asked Greg if the shakeout among e-commerce companies was making recruiting more difficult. While he admitted that the going was tough, he liked the idea that the candidates he talked to wanted to work for the company primarily because of the work itself, not because they could cash in and walk away with a handsome bundle in 18 months.

Hopefully that same philosophy will strike a chord among those dotcom high-fliers who now find themselves pounding the pavement. While hitting pay dirt before 30 is nice, the rest of us have learned to find contentment through a job mastered over time. In the end, this is not a bad way to be.

Welcome to the ranks of people like me—ants not grasshoppers—who grow their retirement nest eggs one decade at a time. **CIO**

Senior Editor Megan Santosus, who is way too young to be thinking about retirement, can be reached at msantosus@cio.com.





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How information flows on the Internet

Hurry Up, Already!

BY RICHARD DAY

SPEED CAN BE your best friend and your worst enemy. On one hand it can quickly get you where you want to go. But if you don't know exactly where you are going it can drop you miles from your destination. I learned this when, along with two coworkers at a former job, I left to start a new company. We had been working together for the last year at a software company and often felt as if we were reinventing the wheel with every new customer. It became clear that providing a complete solution to customers' problems, rather than just tools that address individual aspects, would make for not only a more compelling offering but also a more rewarding and interesting job. This couldn't have been more true. So in October 1999 we founded our company, Speedera, to provide a set of services for delivering data and applications over the Internet.

It was a tall order for three recently unemployed guys—me as CTO, Ajit Gupta as CEO and Eric Swilden as vice president of engineering—and that's where the necessity for speed entered the picture. We knew that the market opportunity wasn't going to be around forever, and we had to build the initial architecture of the service, staff the company, raise funding

and perform all the minor tasks that go along with starting a business—quickly. As the CEO has often said, speed wasn't only our name, it was our competitive advantage as well.

From our network of friends we were able to bring onboard strong leads to spearhead the engineering efforts. On the fundraising side we all worked on the initial pitches to the venture capitalists. We started with angel investors who set us up with an initial amount of money. Because raising money is very distracting and time-consuming, we were caught between wanting to get more funding and wanting to get straight to work. We thought of starting small—working out of somebody's garage until we could get up-and-running enough to look for more funding. But as we looked at the time-to-market issues, we chose to use the big-bang approach and make a bigger effort early on.

During the next eight weeks we achieved a great deal. Our funding round closed, which means we got the money to move into our current office and deploy a prototype of our service. Many of the people we have worked with along the way, like the VCs, real-estate agents (acquiring real estate in Silicon Valley is no easy task) and customers themselves have been impressed at the rate at which we were able to get off the ground. Growing from three to 90 employees in under nine months while trying to start a company is difficult enough, let alone getting the group to work together to build and deploy a global network of servers. We were able to accomplish what we did because we kept our focus on speed.

I would be lying if I said that we predicted on the first day everything we would encounter along the way. While we did have a strong understanding of where we wanted to go, there are a few things that contributed a great deal to our success: experience, tools and people who can adapt quickly.

Now that we're more established, you might think we'd be able to take a breath. But this is not at all a point of rest. The rate we're moving now is faster than we moved before. And as we've grown, there are more cogs in the wheel that could slow things down. But if the cogs are in the right place, you can cover more ground faster. And there's no rest for the wicked. **CIO**

Richard Day is the CTO of Speedera in Santa Clara, Calif. Looking for a platform for your ideas? Send them to platform@cio.com.





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Would You Hire a Hacker?

BY MARTHA HELLER

DAN GEER, CTO of @Stake in Cambridge, Mass., an Internet security company, hires hackers. So does Firas Bushnaq, president and CEO for eCompany in Aliso Viejo, Calif., an Internet solutions company. In fact, a growing number of security organizations are hiring hackers—people driven by an unquenchable desire to understand programmable systems and find the weaknesses in them.

Some hackers have questionable histories, and some are squeaky clean, but all have what many employers consider to be a crucial element of good security. Geer calls it “the love of the game.”

Bushnaq hired Marc Maiffret as “Chief Hacking Officer” of eEye Digital Security, a division of eCompany, precisely because of that drive and desire to test and retest systems. “While other developers would go through the front door and set up the installation and network configuration,” says Bushnaq, “Marc looks for the back door into systems. He will search for a flaw until he finds one.”

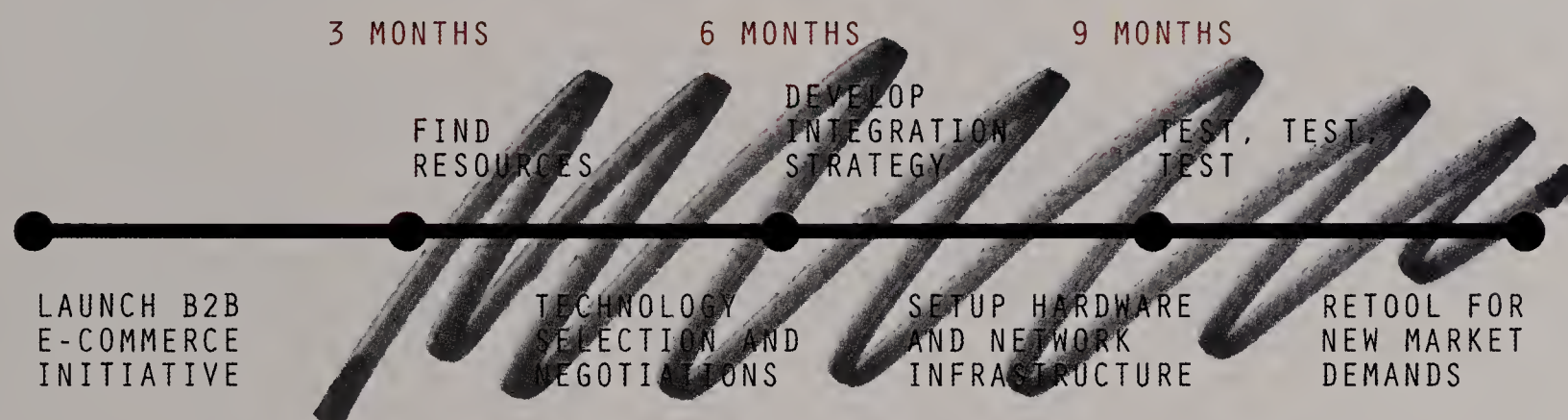
Mike Higgins, president and cofounder of Para-Protect Services in Alexandria, Va., is not convinced that hackers make



good security consultants. In addition to acknowledging the risks of hiring someone who may have gained his skills through illicit activities, Higgins worries that hackers may not have the training or the discipline needed for thorough security work. “Hackers give off this aura of knowing more than anyone else,” Higgins says. “But they are usually not as well-trained as traditional IT professionals, and they often don’t have the discipline or processes to do repeatable testing.” Enamored by the newest, sexiest security tools and fixes, Higgins argues, hackers will not always bother to fix the processes that allowed for the flaw in the first place.

For Geer, as long as the manager of a security company or information technology department is on his toes, the benefits of hiring hackers far outweigh the potential dangers. “If I am a good judge of character and am minding the store,” says Geer, “then I risk little by hiring hackers. It’s only when the

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sergeant is a thug that you need to worry about the infantry men who are armed.”

Does the talent, knowledge and energy that hackers bring to the job outweigh their potential for unorthodox processes and possibly even antiestablishment tendencies? Would you hire a hacker? Tell us what you think. (For more on hackers turned consultants, see “Pro and Con,” *CIO*, June 1, 2000.)

Senior Web Editor Martha Heller can be reached at mheller@cio.com.

WOULD YOU HIRE A HACKER?

Want to sound off on this or other topics? Join the ongoing debates at comment.cio.com.

HIRING A HACKER IS THE SAME AS HIRING AN ARMED THUG for security. Sure, thugs can provide security on a street-level scenario, but for a true world-class security department, you must invest in a professional security department. Some companies look for the easy way out and hire the street thugs, but having dedicated professionals doing security is the true sign of a best-of-breed operation. (Remember, you get what you pay for!)

Richard Cope

*Manager, IS and Technology
The Clorox Co.
Oakland, Calif.
richard.cope@clorox.com*

YES, HACKERS ARE IMPORTANT. THE FBI USES INFORMANTS, the media has secret sources and banks hire former con men to teach employees scams to look out for. The IT industry needs to do the same.

Scott Johnson

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I WAS LABELED A HACKER 10 YEARS AGO WHILE WORKING as an independent consultant (not specializing in security) for a large multinational. The majority of IT managers there were appalled that I had the audacity to not only break into all of their systems but to present them with a detailed analysis of what their problems were and how to fix them. The security chief demanded that I be terminated immediately. Six months later I had his job.

I've moved on to bigger and better things, but being a

“hacker” to me means being a person that is knowledgeable in a breadth of technologies, as well as the scope of companies' business systems. I only wish that I could now find more people like this, which is the real issue.

Anonymous

Wall Street CIO

FROM WHAT I READ ABOUT HACKERS, IT'S THE THRILL OF the game that gets them excited. Most of the time the game is benign, but there are times their actions are meant for criminal purposes or to prove a point. Also, doesn't hiring hackers validate and even encourage an illegal activity? The question is, Is the thrill still there if it's your 9-to-5 job? My guess is that a hacker will lose interest quickly.

I think you are better off challenging people within your company to find the holes; they are the trained professionals, and everyone loves a challenge. Plus you protect the integrity of the IT industry.

Cary Weltken

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I WOULD ABSOLUTELY NOT HIRE ANYONE WHO HAS illegally hacked into private networks. In an industry where ethics may be hard to come by, I am strongly against rewarding those who have done wrong.

Rick Ollerman

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THE ARTICLE IS IRONICALLY ALL TOO FAMILIAR FOR ME. In recent months, my company has invested a tremendous amount of resources into persons who are classified as hackers. Much like the recent ventures with well-known hackers, such as the team from L0pht Industries with the likes of major vendors such as Compaq, I too found a need and an opportunity for the would-be opportunist. I was able to find people who work for very sensitive areas of the government and now are able to reap the rewards of doing what they do best and that is to identify deficiencies.

Hiring them was one thing—keeping them happy is another.

B.J. Carter

*CIO
ValCom
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here shall be wings! And man, who shall
know all and shall have wings shall also
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—Leonardo da Vinci (New Translation)



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Opinion | From the Publisher

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Long Live Security



Gary J. Beach

ON THE WAY HOME from a tour of colleges with my daughter, we decided to stop in Stockbridge, Mass., to visit the Norman Rockwell Museum.

Unfortunately the museum was closed, but after an iced tea on the porch of the famous Red Lion Inn, we wandered in and out of shops around town.

Once a magazine junkie always a magazine junkie. So it was hardly surprising that I was immediately attracted to a shop that sold old magazines. Flipping through covers of famous magazines from the 1950s and 1960s, I came across the June 1965 issue of *Look* magazine with the following headline on its cover: "Computer Data Banks: Do They Know Too Much About You?"

Submit that writer's name for a Pulitzer Prize...this year!

With all that has happened since the Internet burst onto the scene in 1995, it is easy to forget that personal privacy—and how computer technology has changed the nature of it—has been an issue for the general public for a long time.

Many feel the Internet killed privacy in America. From where I sit, privacy has been dying for quite a while. When was the first time you got a mid-dinner direct-marketing solicitation? I bet it was way before 1995. The fact is, the Internet was just the last spike in privacy's coffin.

Most of us think we do a good job protecting our privacy. Think again. How many times in the past week have you used your credit card to make a purchase, shared your telephone number with some store clerk (I always lie!), extracted money from an ATM or flaunted the big privacy kahuna—your Social Security number—in public?

Need proof your privacy barriers are low? Check the composition of your family's mailbox. Mine is about 60 percent junk mail. And hold on to your hats...the U.S. Postal Service wants to give every home in America an e-mail address! My CIO e-mail address is increasingly congested with junk mail, most of which comes on weekends.

Speaking of government, here's a really scary thought: Congress and the 50 state legislatures are entering the privacy debate. It's only about 35 years too late. And if past is prologue, when government deals with complex issues—and privacy protection certainly counts as one—it tends to come up with sledgehammer solutions when a flyswatter would do.

True privacy in America lasted three weeks after the Pilgrims landed about 50 miles southeast of my office in the 17th century. Yes, privacy is dead. But security isn't.

As CIO, it's your fiduciary responsibility to allocate as much of your budget as you can to building the most secure infrastructure money can buy. Corporate privacy isn't about privacy; it's about security and namely how much your board is willing to invest in it.

Your twofold strategy should be this: Prominently post in plain English—without the legal mumble jumble that reads like the fine print in an automobile commercial—your company's privacy policy on your website, and then do all you can to build a digital fortress around your customers' data.

For centuries, commerce has been built on pylons of trust. Nothing has changed in the era of e-business.

For those readers wanting a privacy utopia I have simple advice. Buy a ranch in Wyoming. With cash. And without telephones or mailboxes.



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Isn't It
Time You
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Reporter Dispatch

Environmental Impact

You can't talk about San Diego without mentioning Connecticut, at least not in the IT context. In this issue, you'll read about San Diego County's landmark IT outsourcing initiative. It's the biggest municipal government outsourcing deal ever made, and it comes on the heels of Connecticut's failure to strike a similar deal.



In many ways, comparisons between San Diego and Connecticut are inevitable and appropriate. The comparisons don't end with bid specs and contract language though. I've visited both IS headquarters—boy, what a difference.

Until recently, Connecticut's IS headquarters was a dump, hiding out in an old building swept onto a downtown Hartford side street in the distant shadow of the State Capitol. The building's structure is so compromised it actually leans in places, and the interior design is long overdue for a makeover—hardly an inspiring place to work.

San Diego's County Administration Center, on the other hand, is a jewel. Located on San Diego Bay, this 62-year-old facility was designed by architect Samuel Hamill in a Spanish Revival style (with Beaux Arts influence, I'm told). Originally built to house city government in one wing, county in the other, today it houses just the county government (city officials moved into a new City Hall some years ago). Aside from the stunning architecture and immaculate landscaping, what struck me most are two huge inscriptions greeting visitors at the main entrances: "The Noblest Motive Is the Public Good" over the west entrance and "Good Government Demands the Intelligent Interest of Every Citizen" over the east.

I would never suggest that Connecticut's outsourcing bid was doomed because of the IS organization's former crummy facilities. Nor would I say that San Diego's beautiful county headquarters means anything when it comes to meeting IT service levels. If environment influences attitude though, then I've got to believe that San Diego County has created a workplace in which people can be proud, a place where they're inspired to succeed. For IT outsourcing's sake, that's got to be a good start.

—Tom Field

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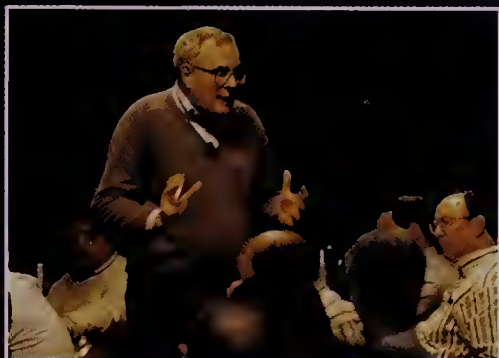
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Interview

BY DEBBY YOUNG

Hall DAVIDSON

Hall Davidson is the Emmy-winning director of educational services at KOCE-TV, a public television station that serves the Los Angeles area. He is also executive director of Telecommunications of Orange County, a media and educational consortium. He writes on the impact of technology in education and has served on technology education task forces and advisory boards.

CIO: You refer to the modern office workstation as a "death trap for creativity." Why?

DAVIDSON: Neurologists and anthropologists are now proving what educators like Montessori knew all along: People learn with their hands. Reaching, grasping and manipulating things with two hands stimulates sections of the brain connected with creativity, intuition and problem-solving. If you spend hours at a time moving a mouse along a two-dimensional plane, you put that creative part of your brain to sleep.

So is all the effort companies put into making an ergonomic workplace misplaced?

No, but if CIOs think of people only in terms of connections to the network, they're

going to fail. When you hire somebody, you want them to use all their brain. Yet the physical work it takes to do the tasks that we have people do on the computer stifles the kind of creativity we want to stimulate.

Neurologist Frank Wilson studied why young engineers couldn't solve problems as well as older engineers could. It wasn't a matter of intelligence. But older engineers invariably worked on their own cars, got under the hood and fixed them. Engineers from the generation of throwaway parts never did that reaching and grasping, which stimulates the problem-solving areas of the brain.

Should companies totally redesign the workplace then?

Not at all. Just walk around and look at the cubicles of successful problem-solvers. See how much of what goes on there involves three-dimensional hand activity. A Rolodex that has to be turned by hand. A Velcro dart-

board or a Nerf ball game in the corner. It's all stuff that they're using to help them think.

The important thing is to make sure you offer an environment with enough activity to stimulate the brain. Put in a pinball machine where you have to gauge the tension on the ball release rod. Or set up a communal needlepoint project. Whatever. The activities don't have to be intellectually satisfying, just something to break up the single-handed, two-dimensional activities that take place in most cubicles. Make 10-minute play breaks part of the routine to clear the mind and stimulate the brain. If you do that, I would bet that within a year you would have a department that's contributing at a much higher level than before. **CIO**

Debbi Young is a freelance writer in Framingham, Mass. Share your brain stimuli with us at interview@cio.com.



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